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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with every copy of this week's issue

London Transport General Manager (Operation)

NEARLY six years have passed since the establishment of the London Passenger Transport Board, and one of the most important tasks of the board during the intervening period has been the welding in one organisation of the many separate undertakings, both road and rail, that were acquired. A further step in this progress of unification is the appointment, which becomes effective on Monday, of Mr. T. E. Thomas, as General Manager (Operation) for the whole of the board's services. When it began its operating existence, London Transport naturally continued for the time being to maintain as separate units the chief of its constituent undertakings, and Mr. Thomas himself, for example, was first appointed General Manager, Tramways (Central, Southern, and Eastern Areas). The company-owned tramways of the old Underground group were next brought under his control, and in October, 1933, he became General Manager of the London Transport tramways and trolleybuses. With a view to securing a greater measure of co-operation between the road services provided by the board, the organisation was revised in February, 1936, and Mr. Thomas was appointed General Manager, Road Transport. His new office now gives him for the first time direct responsibility for railway operation, as his wide experience heretofore has been in the operation of all forms of surface transport. He began his career with the old London United Tramways and remained with that company and subsequently with the Underground group until 1917, when he transferred his services to the London County Council Tramways as Development Superintendent. Eight years later he was appointed Traffic Manager, and in 1930 succeeded Mr. J. K. Bruce as General Manager. At the time of his appointment as General Manager, Road Transport, L.P.T.B., we remarked that Mr. Thomas had become responsible for probably the largest road transport fleet in the world under one ownership, and it is a measure of the success with which he has handled this task that he has now been given the added responsibility of the extensive underground and tube railway systems, which, in view of the development works now approaching completion, are destined to form an increasingly important part of the board's services.

* * * *

The Railway Clearing House

Mr. E. E. Painter, retiring Secretary of the Railway Clearing House (see page 556), has lately made public in an address to the Industrial Transport Association (reported in our January 13 issue) some of the manifold but little-chronicled activities of an institution he described as "the maid of all work of the British railways." His metaphor was singularly apt, for the work of the Clearing House not only covers the division of traffic receipts (whether passenger, goods, livestock, or mineral), and the mileage, demurrage, and the common-user of railway stock—the latter involving the bombardment of returns prepared by the R.C.H. numbertakers, who in 1938 forwarded 10,000,000 entries in respect of stock exchanged between the companies at junctions—but also the work arising from the multitudinous inter-railway meetings, which in 1938, for example, reached a total of some 2,000. Railway grouping has meant a substantial reduction in the number of Clearing House staff employed, but the total today (including numbertakers) reaches about 1,800.

* * * *

The Week's Traffics

Last week's combined traffic decrease of £29,000 shown by the four main-line companies in comparison with the corresponding week of 1938 was the lowest recorded this year. The fact that it goes against an aggregate decrease of £402,000 shown in the 12th week of 1938 may be discounted to some extent by the last-mentioned week being in comparison with Good Friday week 1937 and thus bringing its passenger train earnings down by £570,000. For the twelve weeks of the current year the combined earnings of the four companies amount to £33,215,000, a decrease of £1,789,000 or 5·11 per cent.

	12th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	−11,000	− 12,000	+ 35,000	+ 12,000	− 706,000	− 4·97
L.N.E.R. ..	− 4,000	− 39,000	+ 12,000	− 31,000	− 708,000	− 6·68
G.W.R. ..	− 3,000	− 3,000	+ 5,000	− 1,000	− 290,000	− 4·93
S.R.	− 5,000	− 5,000	+ 1,000	− 9,000	− 85,000	− 1·97

London Transport receipts for the past week were down £7,600, but the total for the financial year to date is £22,087,800, an increase of £191,000. Great Northern (Ireland) traffics for the twelve weeks show increases of £2,150 under passengers and of £11,600 under goods, and the Great Southern has brought down its previous decrease to £6,461.

* * * *

The Velox Boiler

Elsewhere in this issue we publish a more detailed description than has hitherto been available of the experimental French locomotive equipped with a Velox

steam generator. On the whole, engineers departing very far from orthodox steam locomotive practice have had but scant success in the past, and ambitious experiments have, for the greater part, served but to reveal the practical superiority of conventional designs. In the latest French experiment, a departure is made only in the boiler, but it has been just this same abandonment of the usual locomotive type of boiler which has most frequently brought misfortune upon the innovator. For this reason the French experiment will be watched with the closest interest. In two important respects the Velox boiler can be expected to prove equal to the conditions it must encounter. It will provide as much steam as the boiler it replaces, and possibly a good deal more. Also it will be quite unaffected, as regards both its operation and its working life, by any lack of rigidity there may be in the framework of the engine. It consists of a number of independent and relatively small units which present no difficulty in mounting. That it should call for the use of oil fuel and be relatively complicated are drawbacks; but set against these are many advantages, not the least of which is the facility it gives for raising steam in a few minutes.

* * * *

Conversion of Trenance Viaduct, G.W.R.

Last Sunday, G.W.R. engineers entered upon the final stages of converting the Trenance viaduct, Newquay, from a single- to a double-line structure. An earlier process in the reconstruction was dealt with in our issue of February 17, when we described how on October 9 last the 450-ft. steel girder superstructure was slewed six feet transversely on to extensions of the existing stone piers, to allow widening of the piers and erection of the granite arches that will eventually carry the double line. The work last Sunday consisted in shifting the line back from its temporary alignment to the new granite arches. Next Sunday, April 2, the old steel girderwork will be removed to leave the way clear for construction of the remaining sections of the arches, that will carry the additional line now to be provided. Trenance viaduct, 450 ft. long and with nine spans, carries the G.W.R. line at a height of 75 ft. above the Trenance valley, in which are situated picturesque public gardens known to thousands of holiday-makers. The work of reconstruction is part of the company's scheme to improve passenger and traffic facilities at Newquay, necessitated by the growing popularity of the town as a summer resort.

* * * *

Dr. Leslie Burgin on the Footplate

In accordance with his policy of obtaining first-hand experience of working conditions of all types of transport, the Minister of Transport, Mr. Leslie Burgin, sampled locomotive footplate work on Tuesday last by making a journey from Euston to Blisworth and back on the engines of two L.M.S.R. express trains. The Minister travelled outward by the Royal Scot express, which was stopped specially at Blisworth in order to enable him to return to London for a public engagement. At Euston, Mr. Burgin was seen off by L.M.S.R. representatives including Lord Stamp, Mr. Ashton Davies, and Mr. W. A. Stanier; Colonel Mount, the Ministry's Chief Inspecting Officer for Railways, was also present. Particulars of the outward run will be found on page 543. On the return journey with the 8.30 a.m. from Manchester, Mr. Burgin travelled on the footplate of "Patriot" class 4-6-0 No. 5516, *The Bedfordshire & Hertfordshire Regiment,* which, hauling a load of 220 tons tare, covered the 62·8 miles to Euston in 60 min., inclusive of a 15-m.p.h. p.w. slack at Hemel Hempstead; for a distance of 26·8 miles between Castlethorpe and Berkhamsted (including the rise over Tring) an average speed of 73·6 m.p.h. was maintained. The driver and fireman on this run were H. Thorndyke and E. Green, of Camden Depot. In an interview with press representatives, the Minister stated that he had thoroughly enjoyed his footplate experience. He expressed himself as being full of admiration for the care and confidence shown by the enginemen, and also took particular interest in the colour-light signals which he saw either in operation or in course of installation at various points *en route*.

* * * *

Nearing Finality at Wembley Park

For some time now Wembley Park station has been the storm-centre of reconstruction work on the Metropolitan Line, London Transport—an obstacle to be approached with beating heart and passed with inexpressible relief by the traveller in a hurry. A hitch at Wembley Park might keep trains standing for what seemed interminable minutes at distant Preston Road, and although there was no lack of official assurances that "there's a good time coming," there were moments when the regular traveller almost lost faith. But bit by bit the straightening-out process has continued. A little delayed by the crisis of the moment, the flyunder for the Stanmore line trains and altered signalling arrangements were brought into use on November 5. Now, on Tuesday last, the flyunder to the south of the station was also opened to traffic. This is a concrete tunnel 330 ft. long communicating with the enlarged rolling stock depot at Neasden, and avoids crossing movements over the running lines by trains entering and leaving service. At present there are 200 movements to and from the depot a day, and the number will be increased when Bakerloo Line trains are projected to the Stanmore branch. Track work at Wembley in preparation for this event is now almost complete.

* * * *

German Rolling Stock Programme

As we announced last week, a liberal programme of new rolling stock construction to cover the four years 1940-1943 has been authorised for the German State Railway. No fewer than 6,000 locomotives, 10,000 passenger coaches, 112,000 freight vehicles, and 17,300 road motor vehicles are included, at an estimated financial expenditure approaching £300,000,000. This new equipment is required to enable the railways to keep pace with the phenomenal growth of business, freight traffic alone (as we have previously recorded) having nearly doubled between 1933 and 1938, and passenger traffic having greatly increased too. It is a tribute to those responsible for the administration of railways in Germany that on the whole they have been able to cope with the enormous demands thrown upon them with so little depreciation in the quality of the services provided, despite a shortage of steel and certain other materials which has added to the difficulty of maintenance and renewal, and has necessitated the keeping in service of equipment which in other circumstances would have been due for replacement. Nevertheless, the standard of maintenance has not been allowed to drop appreciably from its normally high level.

* * * *

The Condition of the German Railways

It has been freely stated in certain organs of the press that the extensive German programme of new rolling stock construction, referred to in the foregoing note "sheds a glaring light on the enormous deficiencies under which the State railways labour at present," to quote one such

newspaper comment. The remarks of another read that the railways " are suffering from worn out rolling stock, faulty track, and the general effects of being overworked and under equipped for four years." Even the latest publication of the British Railway Companies' Association in connection with the " square deal " makes some questionable statements about the German railways, as for example, when it says that the track in Germany is " by no means up to the highest standards " and that there were 4,000 fewer locomotives in 1938 than in 1929. We take this opportunity of referring again to these extraordinary statements about the condition of the German railways, if only because it is possible to conceive of circumstances arising in which wrong information on this subject might be dangerously misleading. The truth is that the standard of German main-line permanent way today is quite as high as that of any other country in the world. The design which has been worked to for the last 10 or 15 years has provided the Reichsbahn with a track having such a thoroughly sound structure and solid foundation that it requires the minimum of man-power for the maintenance of smooth travel. That the reduction in the number of locomotives mentioned above is not evidence of depreciation may be illustrated by the fact that in this country there were some 3,500 fewer locomotives in service at the end of the same period.

* * * *

Record Central Argentine Railway Run

The record run of the Central Argentine Railway crack express, El Cordobés, briefly recorded in our news columns this week, gains further merit as one appreciates the hindrances to continuous high speed encountered. To cover the 303 km. (188 miles) between Rosario and Retiro terminus, Buenos Aires, in 2 hr. 52 min.—against a schedule of 3½ hr.—with a 325-ton train is remarkable in any circumstances, and especially so in Argentina. But in addition to 3¾ miles of single line working where speed is reduced for staff exchanging, there are several restrictions of speed to 31 m.p.h. at various points in the middle of the run, and speed over the last 8¾ miles into Buenos Aires is limited to 37 m.p.h. A late departure from Rosario on March 5 enabled driver Marcelino Cordoba and his firemen to show the paces of their engine, " P S 11 " class 4-6-2 engine, No. 1118, one of 20 built by Armstrong Whitworth & Company in 1931, having three cylinders and fitted with Caprotti valve gear. The resulting average start-to-stop speed was over 65½ m.p.h. and the booked time was improved upon by 38 min. El Cordobés, as well as being the fastest, is considered the most luxurious train in South America and is air-conditioned. On page 554 we publish an illustration of one of these fine Pacifics at the head of a Central Argentine express. They were described and illustrated in the January, 1931, issue of our constituent *The Railway Engineer*. The coupled wheels are 6 ft. 2½ in. dia., the boiler pressure is 225 lb. per sq. in., and the tractive effort at 85 per cent. of this figure is 38,000 lb.

* * * *

The Tralee & Dingle Railway

After April 17 the Tralee & Dingle Light Railway, which serves the rather sparsely populated Dingle Peninsula in the west of Eire, will be closed to passenger traffic, we announced last week; a short branch to Castlegregory, which leaves the main line near Camp, will be closed to all traffic. The line, laid to a gauge of three feet and opened in 1891, maintained an independent existence, albeit supported by Baronial guarantee, until the 1925 amalgamations in Eire, when it became part of the Great Southern system. It retained, however, its own terminus at Tralee, near to that of the former G.S. & W.R. Since the subsidy ceased, about five years ago, the line has struggled on, but it steadily became clearer that its closure was inevitable, for the resources of the Great Southern Railways were not sufficient to justify undertaking the long-overdue reconstruction work. Besides road competition, the speed restriction, which fixes a limit of 25 m.p.h. on fenced portions of the line and 12 m.p.h. on portions laid along public roads, and the severity of the gradients—as steep as 1 in 30—are hindrances to economical and efficient working. The little 2-6-0 and 2-6-2 tank engines take 2½ hours for the 31 miles between Tralee and Dingle—an hour and a half's run by bus.

* * * *

Operating Ratios

The current number of the *Journal of the Institute of Transport* contains excerpts from a paper by Mr. C. E. R. Sherrington on " Current Transport Problems," the crux of which is financial. The author reviews and compares the situation of the principal railway systems in different parts of the world, and quotes an interesting selection of operating ratios:—

	1936	1937
Four British	79·49	79·36
Belgian National	100·76	98·63
Czecho-Slovak	105·06	98·14
French	104·66	116·00
German	88·16	90·60
Swiss Federal	77·13	66·40
United States	72·33	74·87
Buenos Ayres Great Southern	66·67	71·05
Central Argentine	69·25	79·45
Canadian Pacific	83·18	83·64
Canadian National	91·89	91·12
Indian State	69·50	65·20
New Zealand Government	88·40	92·67
South African	65·42	64·57
Victorian Government	71·62	80·43

It may be noted that even the excellent Swiss figure of 66 per cent. was insufficient to cover the financial charges, owing to the very high capitalisation figure applying per mile. As Mr. Sherrington says, the operating ratio is useful only as an index to the financial position of a railway. It cannot be usefully accepted as an indication of the efficiency of an operating system, and the figure, if misused, may prove misleading in this sense.

* * * *

The Spreadover of Holidays

The British Railways' Press Office has issued a booklet with the object of persuading the public to take holidays at other times than August, the " peak month " when transport and accommodation facilities are taxed to the full. The railway companies suggest that the only solution—as there is no law in Britain compelling people to take their holidays at prearranged periods—is a Voluntary Movement for Spreading the Holidays, a movement towards which travel and transport organisations, hoteliers, and municipal authorities are ready to work. Approximately 20,000,000 more passengers travel by train during August than in May or October, yet the average rainfall in August is much greater than in either of the other months. Many of us know from experience that August can be a treacherous month; too often thunderstorms and rain break up what promised to be a long fine spell. The railways have tried to rid the public of the " August habit " by introducing reduced fare facilities and excursion trains earlier and retaining them later in the year. Those of the public who are free to choose their holiday period are asked to take this year's holiday out of the peak time and so help a movement which is aimed " to make things better for everybody."

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Agreed Charges

THE power granted to the British railway companies under the provisions of the Road and Rail Traffic Act, 1933, to enter into agreements, with the sanction of the Railway Rates Tribunal, for the conveyance of merchandise at agreed charges, has undoubtedly proved of appreciable assistance to them in their efforts to retain traffic to the railway, and to regain traffic which they had lost to competitive forms of transport. The volume of traffic carried under agreed charge arrangements has shown a steady increase since they were first introduced, and at the present time there are over 850 agreed charges in operation, compared with 522 at the end of 1937, representing a gross railway revenue of just over £4,000,000. Approximately two-thirds of the charges relate to traffic conveyed by goods train, and the balance to passenger trains. All the charges are on a unit basis, the unit varying between a tonnage, package, or animal basis, with the exception of that relating to F. W. Woolworth & Co. Ltd., which is based on an agreed percentage, now 3·95 per cent. of the firm's annual turnover. The tonnage conveyed under the last-mentioned arrangement is easily the largest of that covered by any agreed charge, and, thanks to the co-operation of the parties concerned, the detailed arrangements work with remarkable smoothness.

Numbers of agreed charges have been introduced at the request of traders who desire simplification in their accountancy arrangements, but the majority is adopted as the result of representations made by the companies to individual traders. Where a trader is interested in the proposed adoption of this method of charging, the companies' general practice is to make a complete summation of the whole of the transport charges paid by the trader during a representative period. It is then possible to calculate the average charge for each unit of traffic. In the majority of cases this average is accepted by the trader, but it is necessary on occasion to make slight adjustments in the average to allow for alterations in the method of packing, and so forth. The charge, when agreed by the trader, has to be reported to and approved by the Rates Tribunal, which, under the provisions of the Act, has to be satisfied by evidence that the object to be secured in making the charge could not be obtained by the grant of exceptional rates, and also as to its probable effect on the net revenue of the company concerned. The charge, if approved, operates for an agreed period, usually twelve months. During its currency, tests are made over representative periods in order to ascertain whether any material alteration in the flow of the traffic has occurred which would justify an alteration being made in the level of the charge when it becomes due for renewal. Experience has shown, however, that, generally speaking, there is rarely a material alteration in the distribution of a trader's traffic as the result of the introduction of an agreed charge. In cases where it does occur, little difficulty is experienced in securing an adjustment in the quantum of the charge. Traders thus secure the advantage of any time lag in adjusting the charge, but in some cases the lag operates disadvantageously.

The agreed charge principle has been of considerable assistance to the companies in enabling them to secure traffic previously conveyed by traders in their own vehicles operating under "C" licences, and has in a number of cases been of assistance in preventing the enlargement of traders' existing fleets of vehicles. It has also been useful in assisting the railway companies to secure traffic passing to a number of destinations in small consignments for which it would be undesirable to quote exceptional rates. Although the range of commodities charged under this arrangement is steadily expanding, it is confined almost entirely to articles in the higher classes of merchandise, and no attempt has been made to apply it to low class traffics at present. Sufficient experience has been gained, however, to show that the principle is likely to become a permanent and steadily expanding feature of railway practice, particularly as the railway companies hope that the Transport Advisory Council will support their request to the Minister of Transport that they should not be obliged to obtain the sanction of the Railway Rates Tribunal to such agreements in future.

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Queensland Government Railways

THE period covered by the latest report of the Queensland Government Railways—the year ended June 30, 1938—was one of record traffic, as the train miles run, gross steam ton-miles, and total earnings from goods traffic were greater than in any previous year. Gross earnings almost equalled the earnings of years before the depression and were the greatest since 1929-30. The present report is signed by Mr. C. A. Murton, who took office on March 1, 1938, as Commissioner for Railways on the retirement of the late Mr. J. W. Davidson, C.M.G., after holding office for a record term of over 19 years. For the year under review gross earnings showed an increase of £304,711 or 4·38 per cent. in comparison with 1936-37. The greater part of the increase was derived from goods traffic, but all classes of business improved. Working expenses advanced by £419,136 or 7·86 per cent. More than half the additional expenditure was caused by the increase in the basic wage and other payments consequent upon award variations and automatic increases in wages and salaries. Other principal causes were the extra business handled, heavy rolling stock repairs and replacements, additional permanent way maintenance, and greater payments on account of retiring allowances. Net earnings, after payment of working expenses, returned £3 17s. 9½d. per cent. on capital of opened lines, but were insufficient by £129,091 to meet interest payments on capital, which at the rate of 4·15 per cent., amounted to £1,628,970. Operating figures are compared as follow:—

	1936-37	1937-38
Miles open	6,467	6,467
Passenger journeys	25,444,438	25,601,382
Goods and minerals, tons	4,474,548	4,521,563
Train-miles	12,846,622	13,542,542
Operating ratio, per cent.	76·77	79·32
	£	£
Passenger revenue	1,446,773	1,494,493
Goods and mineral receipts	4,186,203	4,383,992
Total earnings	6,949,677	7,254,388
Working expenses	5,335,373	5,754,509
Net earnings	1,614,304	1,499,879

Country passenger earnings improved by £40,853 with an increase of 4,837 in the number of journeys. First class country receipts were higher by £1,168 although the number of journeys decreased by 8,921. Air competition was the principal cause of the reduced number of first class country journeys. In suburban travel private motorcars were probably responsible for the further drop of £300 in first class receipts. The total second class receipts of £1,167,892 showed the satisfactory increase of £46,852, or 4·18 per cent. First class passenger receipts as a whole amounted to £326,601, representing 21·85 per cent. of the total passenger receipts, against 22·51 per cent. in the previous year. Revenue from parcels, &c., was £704,197, an increase of £25,696. Goods and mineral tonnage increased by 1·05 per cent., and the receipts therefrom by £197,789 or 4·72 per cent. The livestock revenue of £671,706 showed an improvement of £33,506. To the goods traffic increase the largest contribution was

that of £86,955 from general merchandise. One of the new mail trains of the Sunshine Express type has been placed in the Brisbane—Rockhampton service, and the construction of a second train of similar type and composition is being proceeded with. Three additional diesel railcar trains, one of which is illustrated in the report, were placed in traffic during the year. Train control equipment was installed during the year between Bethania Junction and Southport, a distance of 29½ miles. The mileage of line embraced by the train control system now totals 874. Sixty-one miles of line were relaid during the year, sixteen miles of which were relaid with 80-lb. rails and the balance with 60-lb. rails. Six new locomotives were added to stock during the year and eleven were written off. At June 30, 1938, there were seventy railmotors in service, of which seventeen were of the diesel type. During the year under review nine petrol engines were replaced by diesel engines, and further conversions are in course of being carried out.

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The Sino-Burma Railway

IN our Overseas columns this week we publish a map and notes on the railways—in operation, under construction, or being surveyed—in what may now be termed Chinese (as opposed to Japanese) China. Although the whole of Eastern China is in the occupation of the Japanese, the remaining western provinces are so vast and populous that an extensive new railway network can and must be built up to develop them rapidly. Rich in coal and other minerals, these provinces still controlled by Chiang kai Shek, have great potential wealth for which there is no adequate means of transport until the various lines are built. The matter is one that touches us especially in this country, as the best outlet from this great area will be the railway—upon which construction is reported to have begun on Christmas day—from Yunnan-fu to the Burma frontier. But if this line is completed despite all the great difficulties its construction will entail, we cannot expect the trade of Western China to flow freely to the port of Rangoon unless we, on our side, are prepared to build an extension of the Burma Railways to meet the Chinese line at the frontier.

At present it is not certain whether the rail-head of the latter will be near Kunlong ferry on the Salween river or at some other point on the Sino-Burma frontier. But whether it be near Kunlong or at Musé on the Shweli river, where the new trans-frontier road enters Burma, the length of railway to be constructed by us will be about or rather under 100 miles; Lashio will, in either case, be the point on the Burma Railways from which the extension will begin. The more likely line to Kunlong could probably be built for £1½ to £1¾ million at the present day, and as both the main line—over 200 miles of which are double track—and the Lashio branch of the Burma Railways are well equipped to handle heavy traffic, an outlay of, say, £2 millions should be sufficient to attract the Western China trade to Rangoon. In the changed circumstances in China, there can be little doubt that such moderate expenditure would be quickly justified, and even after hostilities cease, there is an assured international trade route if the Chinese have completed a railway to the Burma frontier. The one fly in the ointment is that the latter will presumably be of standard gauge like all other lines in China, except the French Hanoi—Yunnan-fu line, which, like the Burma Railways, is of metre gauge. Incidentally, there will be plenty of traffic in Western China for both the French Yunnan Railway —which is reported to be taxed already to the limit of its capacity—and the new route into Burma, the war having resulted in a concentration of enlightened China in this " new " country.

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The Railways of the U.S.A.

THE 52nd annual report of the Interstate Commerce Commission, dated Washington, November 1, 1938, contains an extensive review of the present railway situation in the U.S.A. The railway problem there, it says, is the product of economic conditions. It is not always the same problem, because the conditions change. Some of the causes, such as the industrial depression, are temporary. Others, like the extraordinary growth in other forms of transport, may be permanent. There has recently been an improvement in business conditions, increasing railroad revenue, and certain rate increases have helped. Government loans have been proposed, to assist in the modernisation of equipment. Financial reorganisations are encouraged, as they enable carriers to obtain credit from private sources, but clearly the reform of the bankrupt companies must be pressed to completion. As regards consolidation, the commission does not favour extreme measures, either in the form of a compulsory consolidation into a single system or into a very few systems, or to leave the question entirely to the companies. The recommendations of the President's Committee of March last were along sound lines, and might lead to voluntary consolidation, with pooling of traffics and co-ordination. Meanwhile much improvement has been made in passenger service, although it is mainly in long-haul and luxury travel. In freight service there has been a great improvement in speed. The average speed of freight trains exclusive of switching, was 12 m.p.h. in 1920, and rose to 21·7 m.p.h. in 1937. Some freight trains are now operated at passenger train speeds. The following table gives the principal statistical figures of working for the year 1937, as compared with those of 1936, for all the steam railways in the U.S.A., but excluding switching and terminal companies:—

	1936	1937
Route miles open	240,104	238,539
Passenger and freight train miles	890,935,617	918,489,711
Passenger journeys	490,091,000	497,288,000
Passenger miles (thousands)	22,421,009	24,655,414
Freight, revenue tons originated	958,830,000	1,015,586,000
,, ,, ,, carried	1,712,975,000	1,825,342,000
Revenue ton-miles (thousands)	339,245,826	360,620,269
Operating ratio, per cent.	72·33	74·87
	$	$
Passenger revenue	412,144,000	442,518,000
Freight revenue	3,302,894,000	3,370,959,000
Total operating revenue	4,052,734,000	4,166,069,000
Operating expenses	2,931,425,000	3,119,065,000
Tax accruals	319,701,801	325,689,094
Equipment and joint line rents	134,150,733	131,134,618
Net operating income	667,174,165	590,180,565
Capital expenditure (thousands)	21,961,035	21,694,645

To the net railway operating income in 1937 " other income " is added amounting to $170,337,000, and fixed charges and other deductions are $670,291,000. It is interesting to note the effect of the closing of unremunerative lines, the open route mileage having been reduced from 249,131 in 1927 to 238,539 in 1937, and the track mileage from 434,737 to 414,572. In the same period the number of locomotives was reduced from 65,348 to 47,555, although the average tractive force rose from 42,798 pounds to 49,412 pounds. In the same period also, the number of freight cars fell from 2,378,000 to 1,776,428 and the number of passenger cars from 55,729 to 40,949, exclusive of privately owned cars and Pullman vehicles. In 1937 the privately owned freight cars numbered 290,668, and cars owned by the Pullman Company numbered 7,757. The average number of employees in 1927 was 1,735,105

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and their pay represented 63·62 per cent. of the operating expenses and 47·43 per cent. of the revenue. In 1937 the number had dropped to 1,114,663 but the pay still accounted for 63·66 per cent. of the expenses and 47·66 per cent. of the revenue, although the average per head had only increased from $1,670 to $1,780. A table given in the report shows, on the other hand, that the proportion of stock paying dividends fell from 70·25 per cent. in 1927 to 39·64 per cent. in 1937, the average rate on all stock having similarly fallen from 5·95 per cent. to 2·32 per cent. in the same period. In 1937, 62 Class I railways out of a total of 131, reported no net income.

Unfortunately the experience of the railways in 1938 has been even more unfavourable than that of 1937. Freight car-loadings for the first 9 months of the year were 24 per cent. less than in 1937, and this was attributable to the trade recession, as freight by motor truck was also less. Passenger traffic was similarly affected and the fare increases appear to have had the effect of substantially reducing railway passenger travel. At the same time operating expenses were unfavourably affected by the increase in wages late in 1937, amounting to about 8 per cent. For the 12 months ended with September, 1938, figures as far as available for Class I railways showed $3,566 millions operating revenue and $2,779 millions expenses; $460 millions taxes and rents and $327 millions net, that is, $17 millions less in revenue, and $53·5 millions less in net income. As regards the future, the commission summarises its conclusions, in which some indications are made of the possibilities of improvement. The problem is said not to be one which admits of any quick solution, but rather one that will require a well-directed and continuing campaign, with the co-operation of the managements, security holders, employees and all types of carriers, and shippers, aided by the Government in such manner as Congress may determine.

* * * *

Hungarian Railways in 1938

IN common with certain other railway systems the Hungarian State Railways were considerably affected by the political events of last year. The transfer of territories to Hungary resulted in the addition to the system of 1,228 km. (763 miles) of line—about a seventh of the post-war system of the country—and 247 stations and halts. As these had been staffed for the most part by non-Hungarians, who withdrew at the transfer, a good deal of difficulty was encountered in re-establishing traffic arrangements, while the incorporation of the industries in the districts concerned in the Hungarian economic system can be effected only by degrees. For some time after the change the military authorities remained in possession of the lines, but traffic has been resumed at several frontier points and negotiations are being carried on concerning the regulation of services at places where the lines cut across pieces of foreign territory, and the distribution of rolling stock. The financial year observed by the Hungarian State Railways ends on June 30 so that the latest figures do not cover the most important months politically of last year; nevertheless the threatened changes had begun to exercise some influence on the traffic conditions. The figures which follow thus relate to the financial year 1937-38.

The working showed improved results over the previous twelve months, the first half period especially so, but the hurriedly gathered harvest and the poor fruit season, due to severe weather early in the year, combined with a falling off in transit traffic, spoiled the progress that might have been made. Total receipts came to 258,995,420 pengö against 247,407,790 in 1936/1937, an increase of 4·68 per cent., while total charges came to 285,085,084 pengö against 273,574,953, giving a deficit of 26,089,664 pengö, 0·3 per cent. better than in the previous year. Operating coefficient was thus 110·07 against 110·58. The receipts were made up as follow: Passenger receipts, 75,422,937 pengö against 70,032,870, a rise of 7·5 per cent.; parcels, 945,161 pengö, an increase of 131,235; goods receipts, 161,272,973 pengö, an increase of 2,522,602, or 1·59 per cent.; miscellaneous receipts, 21,354,349 pengö, an increase of 19·9 per cent. Passenger traffic thus yielded the greatest real increase, but all traffics improved, partly on account of the improved economic position but also as a consequence of the energetic efforts made to meet competition by better services and favourable rates.

Expenses rose throughout the period under consideration, due among other things to new wages and pensions arrangements, and to charges arising from essential improvements to track, stations and rolling stock. Wages took 76,895,548 pengö, 4·78 per cent. more than in 1936-1937; materials and operating expenditure came to 85,341,058 pengö as against 78,787,718; while renewals and new works came to 7,882,778 pengö, rising about 22 per cent. Payments for pensions and insurance were 81,388,294 pengö, against 78,293,193, an increase of nearly 4 per cent.; and miscellaneous expenditure totalled 4,216,861 pengö, while interest and depreciation funds took 29,360,545 pengö against 32,529,806, a reduction of 9·74 per cent. The payments in connection with the affairs of the old Danube-Save-Adria Company are included in this item. Actually about 60 per cent. of the total expenditure related to traffic working, the rest going on pensions, loan, and related charges. Hungary was subjected to heavy charges by the peace treaties for the pensioning and maintenance of persons formerly engaged on the railways in lost territories and the effects of this are still much felt. When these and other circumstances are taken into consideration the working of the railways reflects a creditable level of efficiency in no way behind that of the leading European undertakings. About 29 million pengö were advanced by the State in the twelve months for improvements to the equipment. Exceptional charges were incurred for repair shop work, in some measure due to the special traffic requirements arising from the Eucharistic Congress and other public events. The congress necessitated a special traffic organisation; 228 special trains were run and 450 old type locomotives were overhauled and adapted for the service, while some coaching stock was borrowed from abroad. About 1,000 workmen were engaged on the special work required to ensure a complement of efficient stock. Staff employed totalled 30,127 at the end of the year, 841 more than in 1936-37.

Some single lines were doubled during the year, and extensive track renewals were carried out. Several station layouts were enlarged, buildings rebuilt, and bus garages constructed. The Budapest stations were considerably improved in time for the Eucharistic Congress. Extensive progress was made with equipping goods wagons with continuous brakes, introducing new fittings in accordance with international standards, and in improving the refrigerator vans widely used in home and transit services. The Györ—Sopron—Ebenfurt private line experienced a considerable fall in traffic, due to a change in the trend of trade as a result of the incorporation of Austria in Germany, although passenger traffic slightly improved. More railcars were introduced and better road motor services. The Szeged—Csanáder Company, however, had a satisfactory year, passenger receipts rising 11 per cent. and parcels traffic remaining steady. Ordinary goods traffic receipts fell 2 per cent., largely due to the depression in the sugar industry, while fuel wood from Roumania fell off considerably.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

The Locomotive as a Vehicle

81, Central Park Road,
East Ham, E.6,
March 27

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Your re-print of Mr. Stanier's presidential address to the Institution of Locomotive Engineers, in the issue of March 17, raises some interesting points regarding tyre wear, and the influence of tyre profiles on the smooth running of the locomotive when considered as a vehicle.

Despite the fact that experiments indicate that the highest flange forces are obtained at the leading coupled wheels, it is always the guiding wheels, where fitted, whose tyre flanges wear the quickest, and on tank engines especially, the Bissel truck or radial truck wheel flanges wear sooner than the bogie wheel flanges. On engines on which all tyre flanges are beginning to wear, the process of bringing the guiding wheel tyres back to profile by turning, will for a time lessen the rate of wear on the coupled wheel flanges.

The question now arises as to how far flange wear on the guiding wheels, and to a lesser extent on the coupled wheels, should be allowed to develop, and thus increase the total side clearance of the locomotive between the rails, before the tyres are brought back to profile by turning. Also it appears from recent experiments carried out by Dr. R. D. Davies on the lateral oscillation of vehicles carried on bogies* that wear on the tread is almost an equally important factor contributing to a rough riding vehicle.

I would like to suggest that as a result of experiments, it should be possible to produce a gauge, similar to the A.R.L.E. standard profile gauges, which when applied to, and mating with, the worn tyre profile, will indicate that the economic mileage of the tyre since the last machining has been reached, economic from the point of view of maintenance of both the locomotive and the permanent way.

Yours faithfully,
W. G. F. THORLEY

"Northampton Vindicated"

60, Sylvan Avenue,
Timperley, Cheshire
March 25

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with very great interest Mr. Kenneth Brown's article on "Northampton's First Railway," and note that he accepts Miss Joan Wake's (1935) pamphlet "Northampton Vindicated" as having very effectively combatted the charge made against the town of Northampton of having by this opposition kept the main line of the London & Birmingham Railway from its door. When Miss Wake's pamphlet appeared I thought that she had disposed of the matter finally (at any rate so far as serious railway historians are concerned), but I have recently come across a most interesting piece of evidence concerning the question. This is a statement appearing not in the first edition but in the 1862 edition of Samuel Smiles's "Lives of the Engineers" Vol. III.

It will be recalled that Miss Wake laid the blame for the Northampton story on Thomas Roscoe, on account of a statement he made in a book published in 1839. After inferring that Roscoe was unreliable, Miss Wake suggested that every successive writer had copied his statement without confirmation and that no one questioned the accuracy of the statement until Miss Wake herself went into the matter a century later. In point of fact the story was challenged in 1857 and the sequence of events was as follows:—In the first edition of Smiles's work (published in 1857) the usual story of Northampton's opposition was told. This statement having come to the notice of Mr. W. T. Higgins, then Mayor of Northampton, he addressed a letter to *The Times* on September 19 of that year in the following terms:—

"My attention has been called to the following passage in your review of the 'Life of George Stephenson,' by Smiles:—'Extensive tunnels had to be driven through unknown strata, and one of these was the famous Kilsby tunnel, which was entailed on the proprietors by the opposition of the inhabitants of Northampton.'

"I am fully aware that the inhabitants of Northampton are charged with the folly of opposing what would have been of most essential benefit to the town . . . I think the resolution I enclose . . . will satisfy your reviewer that he cannot account for the Kilsby tunnel upon the theory that he has adopted, and the public must be convinced that there was some other cause than the one assigned. . . . I am informed that in the plans originally deposited by the company it never was contemplated coming nearer to the town than about a mile from the present line, and that the company was induced to adopt this line upon the promise of Government support in return for the accommodation it afforded to Weedon. If it is true or not, I cannot say, but if it is, Kilsby Tunnel as well as the Blisworth Cutting must be the result of that arrangement."

The terms of the resolution mentioned by Mr. Higgins were as follow:—

"A resolution passed at a public meeting of the inhabitants held in November, 1830: 'That it is the opinion of this meeting that it is highly desirable that such railway should approach as near to the town of Northampton as possible.'"

As a result Samuel Smiles wrote to Robert Stephenson for further information, and the following was his reply, dated September 30, 1857:—

"It may be quite true what the Mayor of Northampton says, but it certainly does not convey the whole truth. Meetings were held in almost every town on the line, both for and against the railway, but Northampton distinguished itself by being rather more furious than other places in opposition to railways, and begged that the line might be kept away from them. It is true that the low level of Northampton presented a very great objection to the line approaching it nearer than it does; but I had a strong leaning for that direction, because it would have admitted of the line approaching the Kilsby Ridge up the Althorp Valley in a favourable manner. I was anxious to go in that direction for another reason, *viz.*, that the line would have reached a point better calculated than Rugby for commanding the Midland and Northern counties. If you look at the map you will easily see the bearing of this view. The line by Banbury and Warwick I soon abandoned, in consequence of feeling the absolute importance of enabling the London and Birmingham to command the Midland Counties and the districts now traversed by the North Midland. Nothing saved a direct line to Manchester in 1845 but the general position of the London and Birmingham, and especially the bending northwards and passing through Rugby, instead of bending southwards and passing through Banbury and Warwick, which latter course was strongly urged upon me by some of the most influential Birmingham people. Few persons have any notion of how completely the whole system of our railways has been influenced by the bend northwards at Rugby to which I refer. Scarcely a single line that now exists to the north of that point would have been made as it now is, but for the determination I then formed as to the direction in which the railway should be constructed."

In view of the foregoing I feel that Roscoe should not be blamed for having said in 1839 what Robert Stephenson was to say in 1857. As the information was naturally not in the first edition of Smiles's work, which is the edition probably most consulted, I wonder how far the matter is generally known.

Yours faithfully,
RICHARD A. DANE

* In a paper presented to the Institution of Civil Engineers on February 7

PUBLICATIONS RECEIVED

Railways, Roads, and the Public. By Sir Charles Stuart-Williams and Ernest Short. London: Eyre & Spottiswoode (Publishers) Limited, 6, Great New Street, E.C.4. 8¾ in. × 5½ in. 157 pp. Price 6s. 0d. net.—Although this survey does not cover new ground, it gives to the layman a very fair picture of the British railways, their activities, and their present financial plight. That is a useful service, and the authors deserve complimenting on the way they have performed it. Part I consists of a long introduction, the dominant note of which is that the crux of the railway problem, not only in this country but abroad, is finance. It is, as the authors say, the basis of most problems in trade and commerce, but unfortunately it still escapes, in this book as in all previous works on the subject, that full analysis to which it will eventually have to submit. Finance is one of those great mysteries whose very magnitude makes it appear sacrosanct to the humble man in the street; but its operation so obviously underlies the whole fabric of civilisation that, as the dangers which beset civilisation grow more imminently threatening, it is bound to become a matter of increasing public concern. Lately, the ability of the Chancellor of the Exchequer to lay hands on almost unlimited sums of money to finance measures of national defence, without further increasing taxation, has raised the question of whether taxation is necessary at all. The £7,000,000,000 which was raised to pay for the last war has apparently still not been repaid, nor does there appear the least likelihood that it can ever be repaid. Such curious phenomena, when they affect the purse and therefore the whole life of the individual, for better or for worse—mostly for worse—cannot continue to be exempt from irreverent analysis.

However, this is a digression from the present reviewer's proper task—though a relevant digression—so let us return to this remarkably readable book on a hackneyed subject. The authors do not like the idea of nationalisation, but are perhaps not quite impartial in their illustrations, which are taken largely from the experience of such countries as the U.S.S.R. and Mexico. On the other hand, the high efficiency of the nationalised railways of Germany and Italy should not be forgotten; nor should the difference be overlooked between abstract and real efficiency. The commonly-accepted criterion of the former is the "operating ratio," but it does not by any means necessarily reflect the excellence or otherwise of the real service rendered to the public. Nevertheless, as the authors go to considerable trouble to demonstrate, nationalisation would not appear to be any better a solution of the railways' financial difficulties than any of the other "solutions" so far tried. Which raises the pertinent point as to when a "solution" is not a solution. "In Northern Ireland the solution selected was different," say the authors, discussing railway conditions in the distressful country, where, despite the "solution selected" the problem remains unsolved.

Parts II and III outline very clearly the essentials of what the British railways do for passengers and for industry. The examples are chosen with skill and give a very fair and convincing picture of the general excellence of the services rendered despite difficulties. In Part IV a useful review of railway stockholding shows to what a sorry plight the unfortunate possessor of junior stocks has been reduced. "An astounding example of the effect of present-day dividends was brought to our notice recently," say the authors, who are the Chairman and Secretary respectively of the British Railway Stockholders' Union, "when a correspondent told us that she had just received two dividends totalling 3s. 6d. upon a capital of £800,000 invested in the L.N.E.R.!" The "solution" advocated in this book is the "square deal," but our opinion is that something more fundamental than even the "square deal" will have to be sought before the problem can be solved in the sense in which we find that word defined in the dictionary.

A History of the Ribble Navigation, from Preston to the Sea. By James Barron. Printed for the Corporation of Preston at the Guardian Press, Fishergate. 11½ in. × 9 in. × 1½ in. 503 pp. Illustrated, with charts, plans, and views. Price One Guinea net.—This is both an outstanding and a handsome volume embodying the research of many years carried out by the author, who was from 1901 to 1933 the Engineer and General Superintendent of the navigation. It is published by the Corporation of Preston as a record of the work accomplished in the improvement of the waterway of the River Ribble from Preston to the sea, and covers new ground, in that no connected account of the undertaking has hitherto been written. Mr. Barron tells us that few allusions to navigation on the Ribble are to be found in ancient documents, but that after 1700 they become more frequent. It seems that, whereas the mentions of the Port of Preston between 1359 (probably the first) and 1800 have to be sought diligently, the task regarding the period 1835 to date is one of rigid selection among an overwhelming multitude of documents. The first Ribble Navigation Company was formed in 1806, and the second in 1838—it is the centenary of the latter event which has resulted in the production of the present volume. A third company functioned from 1853 to 1883, and then the Corporation of Preston purchased the undertaking. Developments since that time are very fully recorded. In the chapter on "Rail, Road, and Canal Connections with the Dock," the little-known story of the Ribble Branch Railway is told, and brief details are also given of the 28 miles of docks railway, which have 250 points and crossings. These docks lines are served by six locomotives, which include one diesel-electric and one fireless engine (charged with steam at high pressure from a stationary boiler) for shunting in the petrol yards. An account is also given of the Lancaster Canal Company's Preston & Walton tramroad.

Tapered Roller Bearings.—British Timken Limited, of Aston, Birmingham, has brought out a folder devoted to the firm's tapered roller bearings. These bearings have four excellent qualities, namely, those of reducing wear, of saving power, of cutting upkeep costs, and of prolonging the life of machinery. They are made from case-hardening chromium steel, which when specially heat treated has an extremely hard case and a rough core, a combination of properties that ensures that the bearings shall function even under overloads.

Electric Motors.—Two classes of electric motors are described in publications we have recently received from the English Electric Co. Ltd. Class LTS motors, dealt with in publication No. W36, are a synchronous induction series suitable for medium outputs at speeds between approximately 750 and 250 r.p.m., running on two- or three-phase systems up to 3,300 V. The control gear is simple, consisting only of a stator switch and rotor starter as for a normal slipring motor, with the addition of excitation control gear. Starting and synchronising can be satisfactorily accomplished by an unskilled operator. Another publication, No. S94B, gives brief particulars of a series of totally-enclosed motors for use where dusty conditions prevail. These motors have external fans for cooling, operating on the Closvent system for outputs up to 50 b.h.p. and of the closed air circuit type for 50 b.h.p. to 350 b.h.p.

Flexible Bushes.—Wilmot-Breedon Limited, of Eastern Works, Birmingham, sends us a descriptive booklet relating to the Oscillith bush, a flexible mounting already extensively adopted on the Continent for dynamos, brake couplings, point operating mechanism, and so on. The Oscillith bush consists of a cylindrical rubber casing with which is incorporated a spiral spring. When subjected to axial pressure, the rubber casing has the property of forming a series of regular flanges externally and internally, without variation of volume, returning to its original dimensions as soon as relieved of pressure. Oscillith bushes can be used to form mountings which will allow a high degree of oscillation without damage. Applied to universal joints, the bushes can be selected with rubber and springs of different degrees of flexibility, allowing latitude in the radial and torsional variations permitted by the joint. Several applications of Oscillith bushes are illustrated in line drawings, and among them is a flexible suspension mounting for a lighting dynamo under a railway coach, arranged to provide automatic adjustment of belt tension.

THE SCRAP HEAP

Mrs. Mary Ellen Wilkinson, who drove a construction train engine half a century ago and was on the railway payroll as a pumphouse engineer at Cartier, Ontario, says she believes "woman's place is in the home." She has lately celebrated her 97th birthday.

* * *

L.N.E.R. HELP FOR EDINBURGH ROYAL INFIRMARY

The London & North Eastern Railway held an exhibition in Waverley station, Edinburgh, on Sunday, March 26, to aid the Edinburgh Royal Infirmary. The exhibits included the Coronation and the Flying Scotsman complete trains; the latest types of locomotives, sleeping and restaurant cars; a camping coach, an invalid saloon, and a van with signal and telegraph exhibits. Other features were a breakdown crane, and instruments and equipment used by engineers. The exhibition was opened by Mr. George Mills, Divisional General Manager, Scottish Area, L.N.E.R.; charges of 6d. for adults and 3d. for children were made for admission.

* * *

AUTOMATIC STATISTICS

Year by year the Chairman of the British Automatic Co. Ltd. quotes figures to show how firmly the "penny-in-the-slot" habit is ingrained in the British public. At the company's meeting on March 22 (reported last week) he said:—

Last year 600 tons of milk chocolate were sold through the company's machines. The packets laid end to end would stretch from London to Istanbul.

A chain smoker smoking eight hours a day for 50 years would consume only the number of cigarettes put through the company's machines every two months, and would require only one day's supply of book matches.

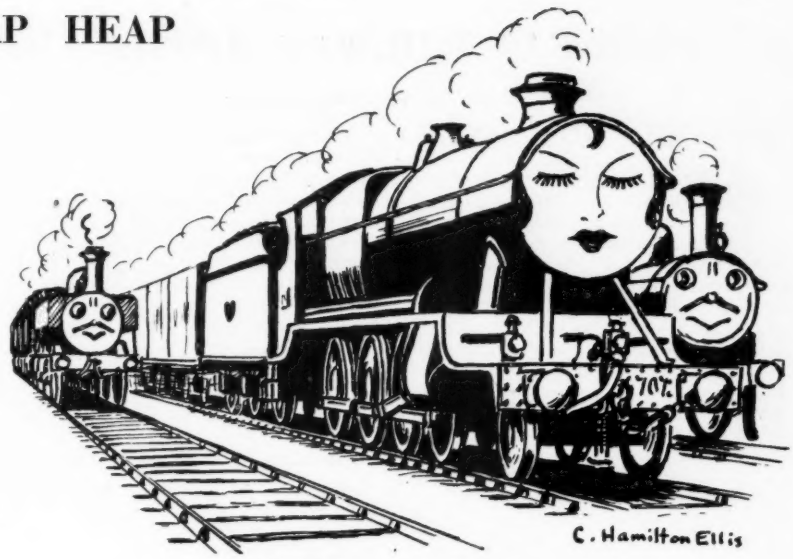
Every day 5,000 tons of people weigh themselves on the company's machines.

* * *

"THE RAILWAY TIMES" AND THE L.C. & D.R.

Little that the London, Chatham & Dover Railway did, or thought of doing escaped the inquisitive eye of *The Railway Times*, which was inclined to cry "wolf" at the very sight of this company's initials. The paper goaded this unfortunate concern with sharp comment through whole volumes of its issues, and the appearance of a new timetable, when the L.C. & D.R. reached London, was treated as a special occasion for sarcastic wit from the editorial pen. Thus in its issue of December 15, 1860, appeared the following:—

"... this company is undoubtedly destined to revolutionise the whole railway world. Its latest effort in this inevitable direction is the issue of a new description of literary timetable,



FAST GOODS

which is unquestionably unique and altogether inimitable. It emanates from the classic quarter of Paternoster Row, albeit Longmans, Blackwoods, and other firms already known to fame are ignorant of it. The title-page informs us that the London termini of the company are at Victoria station, Pimlico, and at London-bridge *on the Brighton line*, the central terminus *being* (that is, *when completed*) in Farringdon-street. The line *is* (not yet, although it is, but *when completed*) the shortest route to *Dover* and Canterbury by 21 miles; it *is* the shortest route to Margate by 30 miles, and eke to Paris and the continental cities (Paris of course not being one of them). Looking at the liberties taken with the English language in this production, and at the ability displayed in affording information to the public, we may infer that the authors are more at home among the advertisements which take advantage of the enormous issue of the publication. For instance, there are some pills announced as producing 'a permanent action of the bowels,' and there is a patient it seems, who, notwithstanding this permanency of action, desires to be furnished with another dose 'for his own use.' This advertiser must be one of the few East Kent original shareholders who applied for another dose in the shape of Western or Metropolitan Extensions.

"In attempting to decipher the train regulations we are met by an apology respecting a few trifling omissions, which, upon inspection, we find to be as under: It is a trifle to state that the forenoon train starts from London-bridge at 14.35, and that the latest train in the evening takes its departure at 2.55. It is left for us, as the mutual friend of the company and the public, to explain that 14 o'clock means 11, and 2 in the evening is intended for 7. Again, there are trains stopping at stations to which there are no fares attached, while others at which there is neither arrival nor departure have the fares exigible appended. We learn, also, that between Dover and London there is a station called New Brompton, and another apparently well known as Shatham; while the proper name for Bickley is Sickley on the down line, although in coming up it is Hickley. There are, it appears, only three trains per day by this shortest route from Dover; that which starts at 7.50 in the morning arriving at London-bridge at 1.10. Unless the happy passenger, gratified at this rate of travel, returns by the 4.50 train he will fail in reaching Dover that night, and then not earlier than 9.10.

"The shortest route to Canterbury rejoices in no less than five trains per day, the dilatory South Eastern providing only seven. It takes three hours by the shortest route, and two hours and a half by the longest, the fares being the same. The advantages of this shortest route must certainly inspire the travelling public with new ideas, if not greater comforts, respecting competition, and its consequent economy in time as well as money. To the stations on the Sevenoaks line, notwithstanding the information respecting fares there and back, the trains it seems have 'not yet commenced running,' while for Margate the service restricts itself from Faversham to Whitstable. We are likewise informed that 'onibuses' (whatever these may be) 'to and from all parts of London attend the arrival of any train at London-bridge'—an accommodation which it might be well perhaps for the Brighton and the South Eastern to endeavour to secure. Altogether, this surprising production is, like the Chatham itself, an attractive effort in a new direction; and we are quite prepared, after a careful consideration of the merits of both, to hear that the public approbation of the one is equal to that bestowed on the other."

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OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

WESTERN AUSTRALIA

Proposed New Locomotives

To initiate a programme of rehabilitation of the locomotive stock, and also to provide a larger and more powerful type of engine than those now in service, arrangements are being made immediately to order the material for ten new engines, so as to enable construction to begin early in the next financial year. The new engines will be of the 4-8-2 type, and the whole of the construction will be carried out in Western Australian Government Railway workshops at Midland junction from designs prepared by the department's own staff. By reason of age and obsolescence a number of the existing engines have practically reached the end of their usefulness as economical haulage units, and the new engines when available will be a welcome addition to the tractive power, and will be invaluable in dealing with the seasonal harvest traffic which forms so large a part of Western Australian railway business.

Amplifiers at Railway Stations

Amplifiers have recently been installed on the platforms at the Perth Central station to convey to the public the latest information concerning the running of trains and general comments relating to country excursions and other railway matters. A similar installation has been made at Kalgoorlie, the junction station for the interchange of passengers between the Commonwealth and Western Australian railway systems, for supplying detailed information to interstate passengers regarding the running of connecting trains, &c. These installations have been found of considerable value in broadcasting up to date details of train movement, platforming of trains and so forth, and they have been very favourably received by the travelling public.

Financial Results

The quarterly report by the Commissioner for the period ended December 31, 1938, shows a loss for the quarter of £69,702, compared with a profit of £20,824 for the corresponding quarter of 1937, and for the six months ended December, 1938, a loss of £256,296 was recorded, compared with a loss of £127,802 for the first six months of the previous financial year. Increased working costs due largely to substantial basic wage increases and to new industrial awards, also the necessity to incur heavy train-mileage in the haulage of water, were mainly responsible for the results obtained, but the failure of earnings for the quarter (£935,900) to reach last year's rather high figure (£953,400) also contributed £17,500 to the loss. The bountiful rains which have fallen in many of the country and Goldfields districts during January and February have eased the water position considerably and their benefit should be felt in the smaller water haulage necessary during the balance of the year. Unfortunately the storms, and in some cases heavy floods, which followed did a great deal of damage to railway property throughout the system, as well as to private property, and this will largely counterbalance the benefits received from the rains.

NEW SOUTH WALES

Sydney Underground Mishap

Early in the morning of January 24, a large water main blew out on the high level Town Hall—Wynyard section of the underground railway in Sydney, and the water so freed rushed to the low level tracks, which, for a distance of 10 ch., were submerged to a depth of 2 ft. 6 in. The ordinary pumps installed were also submerged and it was necessary to run in a high pressure pumping plant from the Central station end of the section. By 12 noon all water had been cleared from the tunnel and ordinary services were restored at 1.35 p.m. The throwing out of commission of the low level tracks made necessary a re-arrangement of train services during the morning peak hours. Bankstown line trains and Homebush local trains, which ordinarily use low level tracks, were diverted respectively to the eastern section of the City railway and to the high level tracks between Wynyard and Town Hall. Delays occasioned passengers during the time the low level tracks were out of commission averaged only 10 min.

NEW ZEALAND

Bulk Travel Vouchers

A new form of annual railway ticket, for use on both road and rail services, has been issued by the Railways Department, to meet the requirements of those travellers—particularly commercial travellers—who find it necessary to use the railway road services in areas which cannot be reached conveniently by rail. At the present time the department operates over 2,000 miles of road routes in addition to over 3,200 miles of railways. The proposal is a new one as far as railway practice is concerned.

The tickets are known as "bulk travel vouchers," and are designed for travel over specific distances by rail or road, namely, for 2,000 miles at a cost of £13 15s. 0d.; 3,000 miles, £19 10s. 0d.; and 4,000 miles, £24 0s. 0d. They are available for use on any rail or road route in the Dominion, except suburban bus services, until the prescribed mileage has been covered, but the maximum currency will be twelve months.

Although primarily intended for road travel, the travel vouchers will be available also for first class travel by rail. On presentation of a voucher, the required tickets are issued at any railway office or by a road service car driver.

In the ordinary course the travel vouchers are non-transferable, but provision has been made for their transfer, for business purposes, from one member of a firm to another, in a manner similar to the procedure followed in connection with railway annual season tickets, on payment of a fee of 15s. for each transfer.

Encouraging Tidy Trains

The department is making a further effort to coax passengers to be tidy in their travel. Some travellers are difficult to train, and even the placing of metal receptacles for refuse in carriages has not checked the bad habits of careless offenders. Slippery stuff, cast in the aisles, is dangerous for passengers and officials walking through the train. Another attempt is now to be made to cope with the nuisance. As an experiment, the air-conditioned cars on the night limited expresses from Wellington and Auckland will be supplied with a quantity of paper bags, 12 in. by 9½ in. with small metal eyelets by which they will be hung from hooks on the walls between the seats. The bags will bear this printed request: "Rubbish Bag—Kindly place any fruit skins or other refuse in this bag for removal by attendant." The co-operation of passengers is sought in this effort to keep the cars tidy, and if this experiment proves satisfactory, similar bags will be provided for other trains.

CANADA

New C.N.R. Refrigerator Cars

The C.N.R. is building 50 freight refrigerator cars of a new pattern at its Transoona shops, Manitoba. Unlike the earlier ones, the bodies of which were entirely of wood, the new cars are all-steel, and in place of end bunkers there will be eight overhead ice tanks, fed from the roof; this arrangement permits of additional loading space. Metal ducts in the side walls will provide air circulation and there will be one semi-circular gutter on each side of the steel floor, connected with drain traps; this will facilitate cleaning and will render the cars more sanitary and free from odours. Meat racks placed at an angle will hold sides of beef more satisfactorily, and there will be other racks hinged to the floor. Walls and doors will have 4 in. and the roof 5 in. of insulation. The new cars will be equipped with all standard safety appliances and with charcoal heaters

attached to the underframe for heating in cold weather. The bogies will have cast steel frames and bolsters and a special device for damping vibration.

Also 25 New Freight Cabooses

The same system is also building 25 freight cabooses, 10 at Moncton shops, New Brunswick, and 15 at the London shops, Ontario. They will have steel underframes and cast steel bogies specially sprung for easy riding. There will be bunks, a stove, and a writing desk in the interior.

TASMANIA

Superannuation Fund Established

Some months ago reference was made in these notes to the expected establishment of a superannuation fund for all members of the Government Service, including the staff of the Railway Department. It is pleasant to be able to report that the fund is now an accomplished fact. A railway representative, Mr. C. G. Wadley, Supervisor of Stores, has been appointed the Government nominee on the board, and an election is now in progress for the appointment of the second member. Mr. J. R. Rule, Assistant Parliamentary Draftsman, has been appointed Chairman of the board. The scale of payments and rates of pension are similar to the systems which have been in operation in Victoria and South Australia for some years past.

CHINA

New Constructions

The first 60 km. of the Hunan—Kweichow Railway, from Chuchow junction—on the Canton—Hankow line—to Hsianghsiang, have now been completed, and work is also proceeding rapidly on the extension further westwards in the direction of Kweiyang, capital of Kweichow Province.

It now appears that a 96-km. section of the Nanchang—Kiukiang line, and a long length of the Chekiang—Kiangsi Railway have been dismantled of track and everything portable to provide materials for the Hunan—Kweichow and other new lines under construction further west.

Work is also in hand on the Szechwan—Yunnan Railway, the earthwork of which is proceeding rapidly. Bridging, platelaying, and other works are, however, likely to take the best part of another two years before this line—which is also being extended to the Burma frontier—is open to traffic. It connects Suifu with Yunnan-fu (Kunming).

Final Surveys

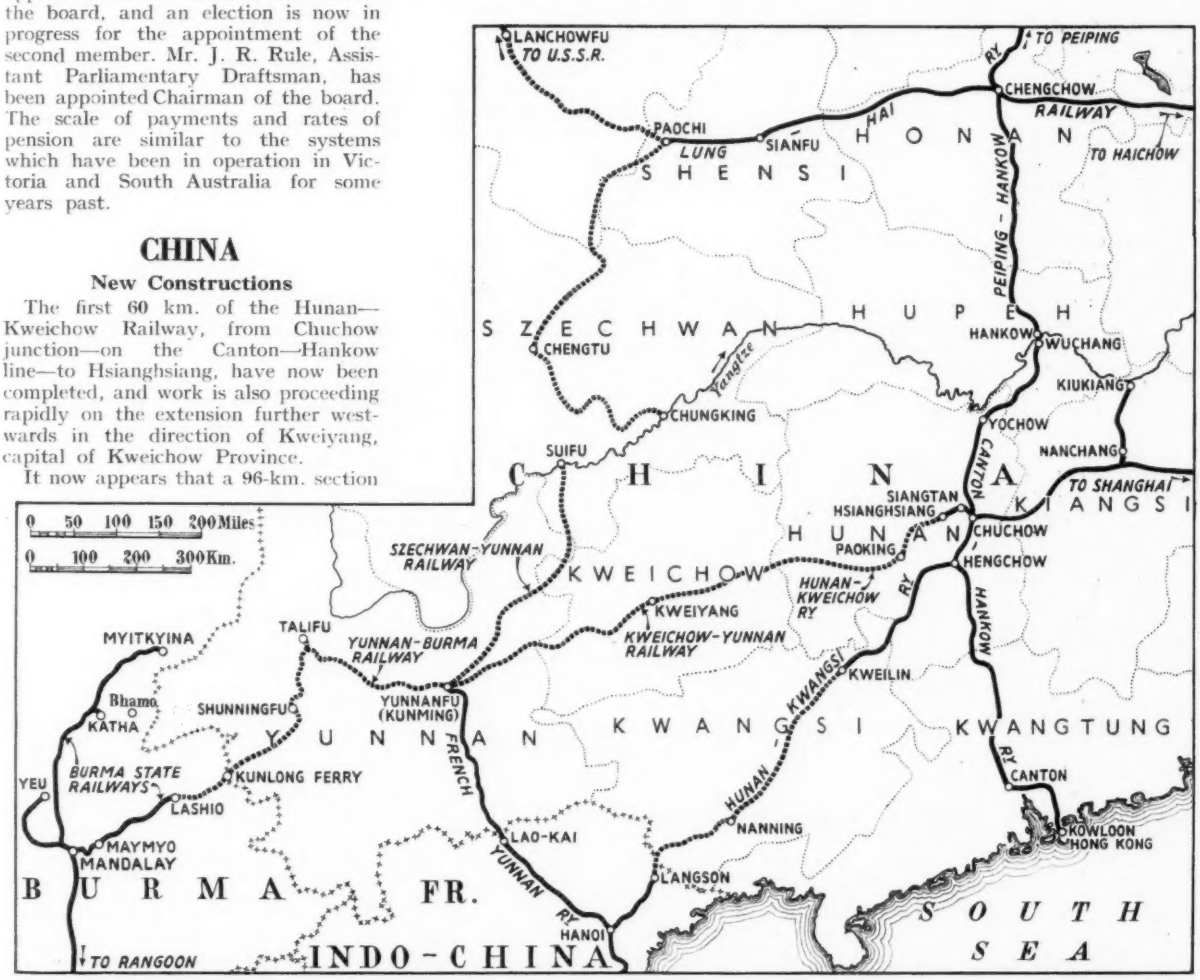
The final survey of the Kweichow—Yunnan line has been completed, but construction is unlikely to be undertaken before the Hunan—Kweichow construction reaches Kweiyang. The final survey of the Szechwan—Kweichow Railway is at present in hand.

The Yunnan—Burma connection is expected to work out at about 800 km. in length, and upon the eastern section of it, between Yunnan-fu and Tali-fu, construction work is reported to have begun.

[The accompanying map gives a general idea of the various lines mentioned above, but does not indicate the exact alignments along which they are being constructed or surveyed.—On page 533 in this issue will be found an editorial dealing with this subject.—ED. *R.G.*]

Inauguration of East-West Railway

An inaguration ceremony, attended by members of the Yunnan Provincial Government and some 1,000 other guests, was performed on Christmas day by General Lung Yun, Governor of Yunnan, when he turned the first sod in the constructions of the Yunnan-fu (Kunming)—Suifu, and Yunnan-fu—Burma railways at Wanchiyin, the junction between them (presumably near Yunnan-fu). In spite of the immense difficulties to be faced in constructing these lines, they are both scheduled to be finished in April, 1941, according to the Governor. The distances from Yunnan-fu are stated to



Sketch map showing the approximate routes followed by the various new railways under survey or construction in "Chinese China" at the present time, and their connections with other railway systems

be 774 km. to Suifu and 773 km. to the Burma frontier (presumably).

The Szechwan - Kweichow - Kwangsi Railway is also under construction from Kweiyang southwards, but its alignment is entirely unknown.

ARGENTINA

Road Competition

The new motor road recently completed between Buenos Aires and Mar del Plata ("the Argentine Brighton") is cutting into the receipts of the B.A.G.S.R. in a much greater manner than was expected. Apart from the large decrease in passenger traffic, for which the road is responsible, goods have also been diverted from rail to road, even fish being transported from the sea to town in large refrigerator lorries. The passenger statistics speak for themselves. Between October 1, 1938, and January 31 this year, 49,647 passengers arrived by rail at Mar del Plata, as against 56,763 in the corresponding period last year, a decrease of 7,116. Statistics compiled by the Argentine Automobile Club show that up to the same date this season, 62,955 tourists arrived by car, as compared with 26,781 last season, and the grand total of both road and rail shows an increase of nearly 30,000 visitors this summer, due to the new road. The omnibus statistics are not available, but the motor coach traffic between the two cities is not very great at present, although it is steadily growing.

Important Legal Decision

An important legal decision was recently come to in the Argentine courts. The National Railway Board (Dirección de Ferrocarriles) brought an action against the B.A.W.R. for the collection of a fine which it had imposed on that company. The board demanded that an embargo be placed upon the company's property to cover the amount of the fine; but the Federal Judge supported the railway's contention that the Government department concerned was not an autonomous entity and, consequently, could not be a party to a lawsuit. The railways have been complaining for a long time that the *Dirección* has been overstepping its rights and privileges, and this decision will be welcomed by the railway executives.

Agreement between Villalonga and American Express Companies

The above transport organisations have entered into a working arrangement for the purpose of promoting tourist movement from Europe and the U.S.A. to South America, and especially Argentina. To this end, an Argentine joint stock company, to be known as Villalonga-American Express, will be formed. Each company will, however, continue to operate under its own name, Villalonga being already very well known to travellers in Argentina, Uruguay, Chile, and other Latin-American countries; while the American Express Company has a world-wide reputation. The head office of the new concern will be located in Buenos Aires, with branches in all the important cities in Argentina and Uruguay. In Chile it will be represented by the Compañia Chilena de Transportes (Expreso Villalonga); and in Brazil by the Sociedade Anonima Viagens Internacionaes. In other countries it will be represented by the American Express Company.

The board of directors of the new company is as follows: President, Mr. J. Calder Angel; Vice-President, Mr. T. C. S. Haslam; Managing Director, Mr. R. S. Cauvin; directors, Mr. C. R. S. Harris, Dr. V. D. Goytia, and Mr. N. Craig.

Record Fruit Exports

Heavy fruit shipments continue to be an important feature of the Argentine export trade, the figures for the month of January last, issued by the Ministry of Agriculture, indicating an increase of 2,579,298 kg., or 74·81 per cent., over those for January, 1938. Among the varieties exported, pears were easily first with 5,617,040 kg. or 93·19 per cent. of the total; grapes amounted to 292,353 kg., and the balance was made up of peaches, plums, melons, and nectarines. The principal importing countries were: Great Britain, 1,721,420 kg.; France, 1,565,620; U.S.A., 874,688; Sweden, 805,840; and Brazil, 651,649 kg. The total quantity exported during the month was 6,027,257 kg.

Grain Estimates

The second official estimate of the grain harvest, issued by the Ministry of Agriculture, shows a slight reduction in all classes, with the exception of wheat (100,000 tons more) as compared with the first estimate issued in December last and published in THE RAILWAY GAZETTE of January 27. The revised figures are as follow:—

	Tons
Wheat	8,700,000
Linseed	1,550,000
Oats	720,000
Barley	440,000

The figures for wheat are the highest ever recorded, with the exception of 1928-1929, when the total reached was 9,499,716 tons.

State Railway Profits

The Argentine State Railways claim to have made a profit of $13,178,598 pesos from their lines during 1938, including $2,636,379 pesos from the operation of the Córdoba Central Railway, under the lease which lapsed when the purchase of this line was authorised by Congress. Full details of the accounts are lacking, so it is not possible to say exactly how this result was arrived at, and what is included and missing on the expenditure side, but it is hardly likely that there is any provision for amortisation. The figures will no doubt make interesting reading for the shareholders of the railway. The gross receipts and total expenses amounted to $94,668,071 and $73,344,831, respectively, distributed as follow:—

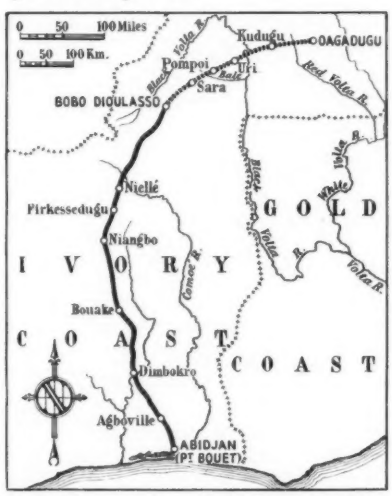
	Receipts	Expenses
State Lines ...	$65,831,981	$53,410,285
Córdoba Central	$28,836,091	$19,934,546

It will be seen that the Córdoba Central surplus amounted to $8,901,545, but this did not allow of the hire, which reduced the figure to $2,636,379. As regards the other State lines, the surplus of $12,421,696 was reduced to $10,542,220 through the return of the salary cuts and sundry other items not included in the general expenditure accounts.

IVORY COAST

Important Railway Extension

The Government of French West Africa has called for tenders for the construction of a 350-km. extension of the railway in the Ivory Coast from Bobo, the present terminus, to Oagadugu, the chief town of the Mossi district and place of residence of the Moro Naba. The reason for the extension is twofold. In the first place, the upper valley of the Volta river, which the new line will serve, is one of the most thickly-populated districts of West Africa, and work for local labour is rare. In the second, the Mossi country, though extremely rich, has hitherto been left almost uncultivated due to lack of transport, and the new line will develop this area, especially by encouraging the growth of peanuts.



Sketch map showing the Ivory Coast Railway extension

The new line will provide a direct rail connection, 1,150 km. long, from Oagadugu to Port Bouet. The nature of the country is such that little difficulty is expected in the construction. The only bridges of any importance which will have to be built are those over the Volta and Bale rivers, the latter a tributary of the Volta. The estimated cost of construction is some fr. 300,000,000, and the work will take about 5 years to complete.

PROBLEMS CONNECTED WITH LOCOMOTIVE DESIGN—III

*Presidential address to the Institution of Locomotive Engineers by Mr. W. A. Stanier, Chief Mechanical Engineer, London Midland & Scottish Railway**

WITH the higher valve velocities which have become common due to longer valve travels and higher running speeds, it is realised that even a small degree of wear in motion pins and bushes may seriously affect the efficiency of the steam distribution. To keep this wear at negligible proportions and at the same time increase availability by reducing lubrication needs to a minimum, needle roller bearings have been introduced on many recent engines. Fig. 7 shows an application to Walschaert valve gear, and satisfactory results are being achieved.

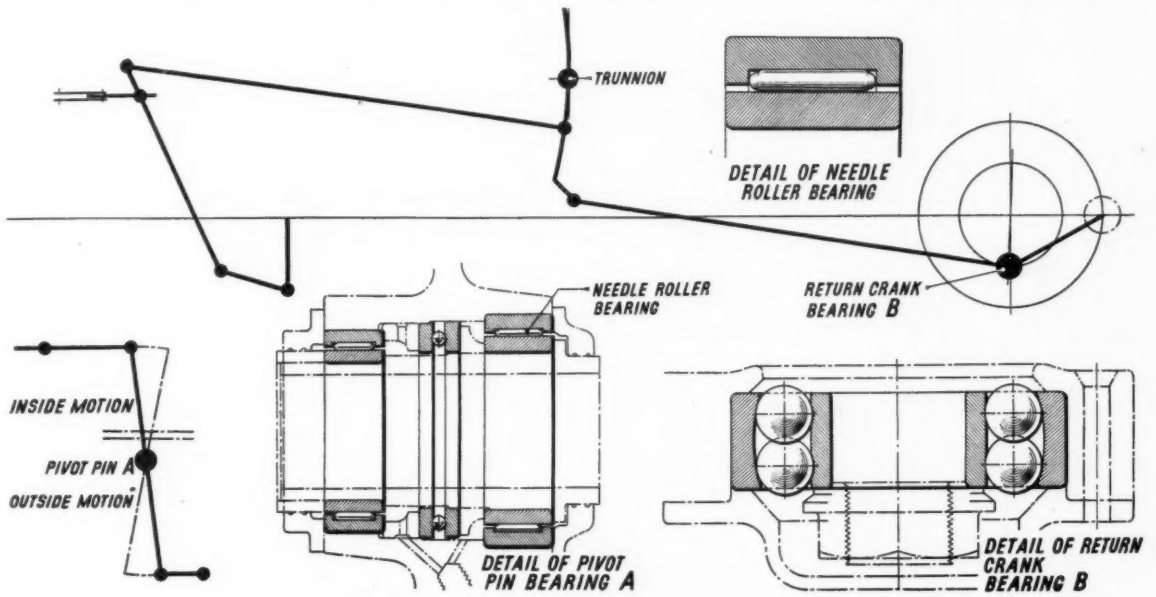


Fig. 7 (above)—Needle roller and ball bearings

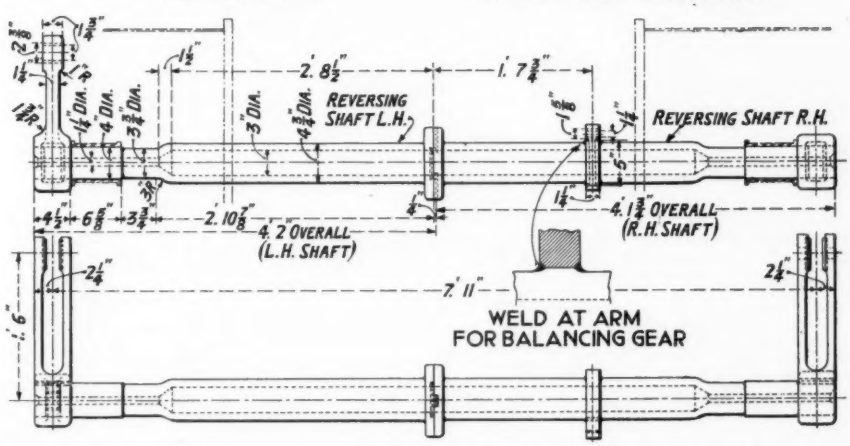


Fig. 8 (right)—Reversing shaft

Of particular interest is the application to the rocking shaft of a 4-cylinder engine. With the consequent elimination of wear at the fulcrum point the main objection to driving an inside valve gear from an outside valve gear on such an engine falls to the ground, and a considerable simplification has thus been possible.

In passing I may refer to a problem affecting efficiency, of which we have long been conscious—the reversing shaft. This particular component has a hard time of it on a modern engine, and it must present a condition of rock-like steadiness at the point where it supports the radius rod, even although that point is at some considerable distance from the point of support and that the shaft has to assume a right-angled bend between them. Very severe loads can at times be applied to the reversing arm, and apart from visible vibration in service, it is occasionally possible for a shaft to become permanently strained without this becoming readily apparent by visual inspection on the two sides of the engine. Unsatisfactory running of the engine can thus be produced which is often difficult

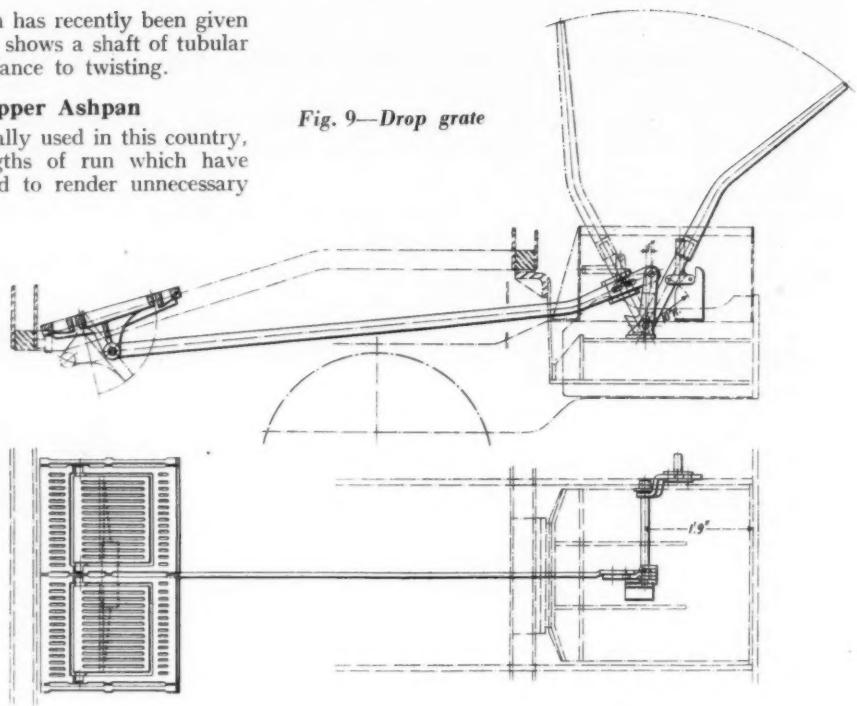
* In our issue of February 24, we summarised and commented upon the presidential address presented to the Institution of Locomotive Engineers by Mr. W. A. Stanier. The full address is reproduced by permission in this series of articles, the first of which appeared in our issue of March 17, with illustrations representing some of the lantern slides shown during the actual reading on February 22

to trace, and some reconsideration has recently been given to the design of this part. Fig. 8 shows a shaft of tubular section which offers a high resistance to twisting.

Drop Grate and Hopper Ashpan

The good quality of coal generally used in this country, together with the moderate lengths of run which have hitherto obtained, have combined to render unnecessary any special means of fire cleaning, although such means have long been common abroad. The ability to clean the fire and empty the ashpan rapidly is, however, now assuming importance under conditions of intensive user and Fig. 9 shows a drop grate.

Fig. 9—Drop grate



A recent paper before this institution dealt with many of the problems in boiler design. I do not propose to go over again the same ground as regards the boiler, but rather to make some remarks on blast pipe and chimney design, which will indicate the problems facing us and the lines of thought on which we are at present proceeding. It may be well to set down briefly certain considerations in front end design. These are:—

(*a*) The draught required for a given rate of working should not be considered in terms of smokebox vacuum alone, but in relation to the whole resistance to the flow of gases from the ashpan to the chimney.

(*b*) That the aim of front end design is to provide the requisite gas flow with the lowest expenditure of energy, *i.e.*, exhaust pressure.

(*c*) That capacity to work at maximum steam production and capacity to work at maximum efficiency are by no means the same thing, but that it should be the object of design to make these two attributes coincide.

Front end design probably constitutes our main field for obtaining improvement in efficiency, but the problem is admitted to be one of exceptional complexity. The following do not pretend to be more than some notes on the three considerations outlined above. With regard to (*a*), it follows that we should not consider the smokebox as a separate entity but rather as a necessary part of the boiler, and although countless attempts have been made to derive formulæ which would give the best arrangement for any engine, these appear to be essentially impracticable.

Certain broad principles have, of course, been established from the tremendous volume of work already carried out, but while we more or less now know what not to do, it is necessary to relate the blast pipe and chimney design to the characteristic of each individual design of boiler. One has only to consider the very wide variations in arrangement in different designs known to steam

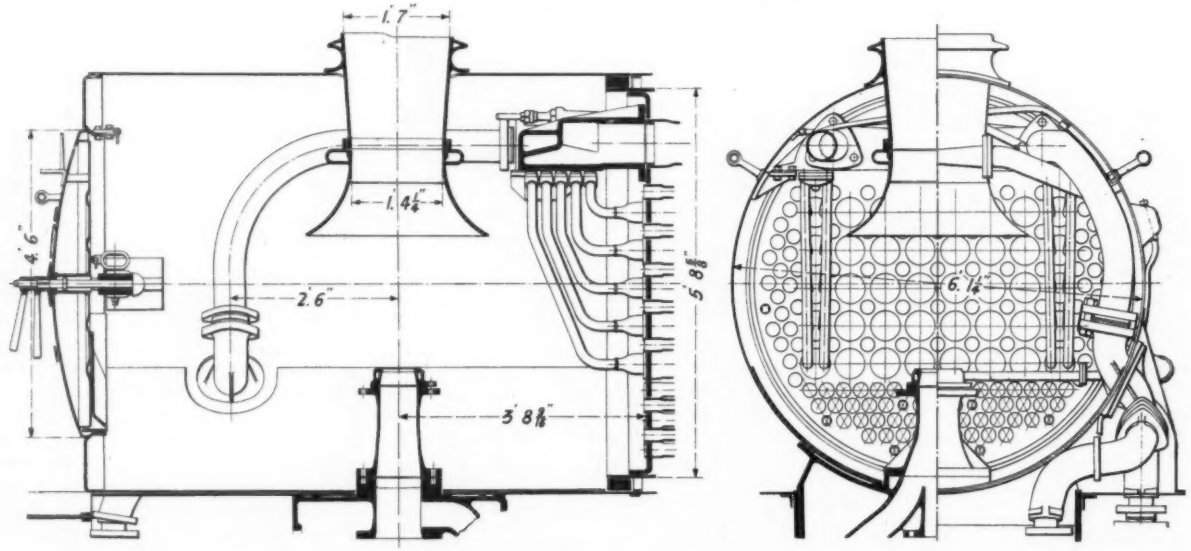


Fig. 10—Front end

well and to appear reasonably efficient, in order to realise that there is, fortunately for us, a fairly wide latitude in what will give at least satisfaction. One, however, of all the numerous possibilities must be the best for any given engine design, and there is still a great deal of investigatory work required before we can be assured.

With regard to (*b*), the question of streamlining of exhaust passages has come very much to the fore of recent years, and some experiments in internal streamlining will be described later in this address. Apart from this, it is becoming realised also that it is unwise to allow fluctuations in cross-sectional area of the exhaust passages. An inspection of old designs will often reveal that little attention was paid to the sections between the valve head and the blast pipe cap, and it was sometimes thought advantageous rather than otherwise for the section to be enlarged in places to give a reservoir effect. It is now realised that it is essential to obviate anything which will give a local pressure drop since the whole effectiveness of the nozzle depends on extracting the maximum energy from the exhaust steam. In the latest designs, therefore, the aim is to employ a large valve, and to design for a steady continuous reduction in cross section from the valve to the blast pipe cap.

Item (*c*) is one on which some clear thinking is necessary. The first essential in any design is that the engine should be a good steamer. Given that the boiler proportions are correct, there is little doubt that from this consideration alone there is no necessity to depart from the single circular blast pipe orifice. It is when an improvement in efficiency is sought by endeavouring to reduce the energy expended in moving the requisite weight of gas, that departure from the classical design may be desirable. Fig. 10 shows a normal blast pipe and chimney arrangement which has shown itself capable of producing adequate steam in a large Pacific locomotive up to the limits of hand firing.

The first and simplest departure from this design, from the point of view of increased efficiency, is the use of a double blast pipe and chimney such as has been tried in many parts of the world. Fig. 11 shows such an arrangement for the same Pacific as above. The object is to obtain first a larger effective chimney choke diameter without having to depress the blast pipe cap below the cylinder level and secondly by splitting the exhaust into two cones, to offer a greater surface to entrain the gases.

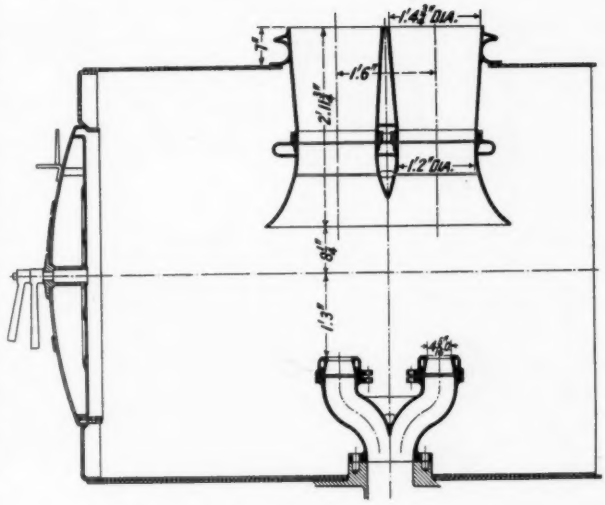


Fig. 11—*Double blast pipe and chimney*

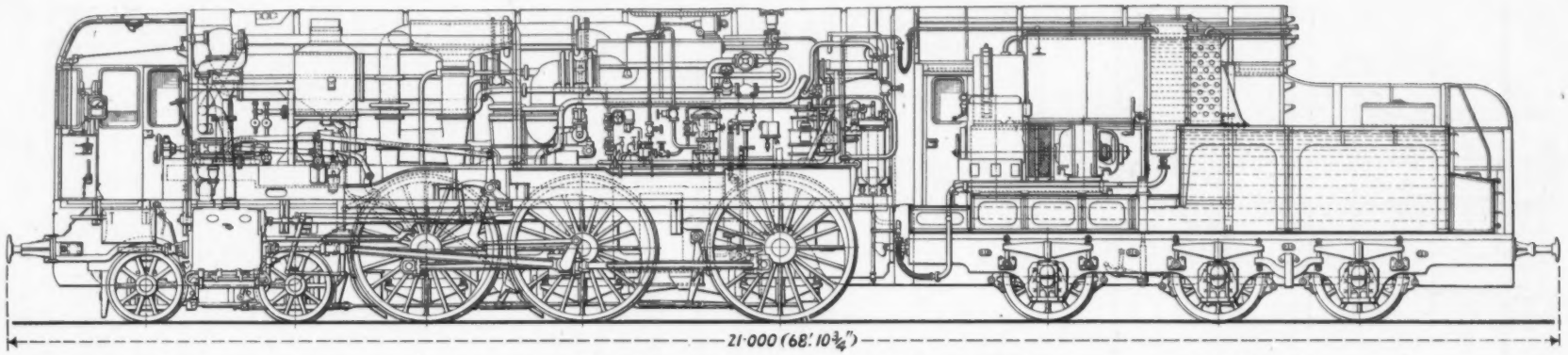
Beyond this point a host of designs have been evolved which split up the exhaust and divide the choke in endless combinations. Once again we must achieve exact methods of comparative measurements in order to decide on the true value of the different possible arrangements.

The Minister of Transport on the Footplate

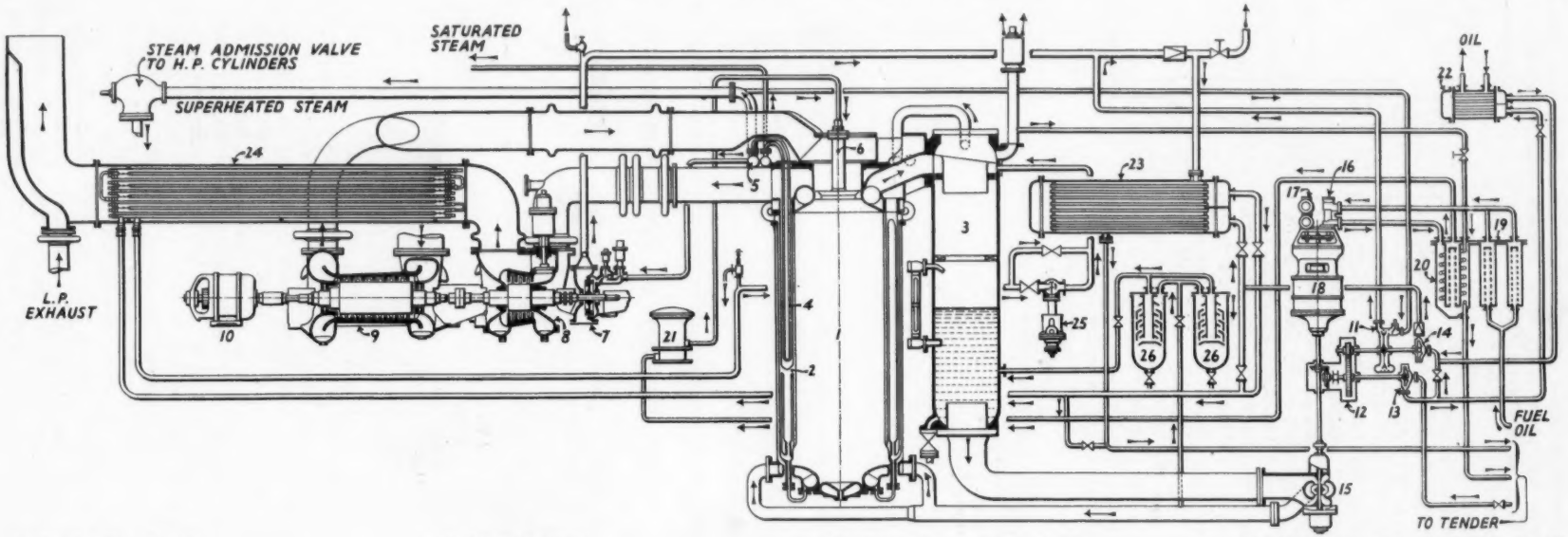
A TRIP by Dr. Leslie Burgin, Minister of Transport, on the footplate of the down Royal Scot express of the L.M.S.R. on Tuesday last was made the occasion of some remarkable running. The load consisted of eleven coaches of 338 tons tare and 355 tons gross, and the engine was No. 6226, *Duchess of Norfolk*, of the streamlined "Coronation" 4-6-2 type, in charge of Driver Swindle, of Carlisle shed. Two severe permanent way checks on either side of Willesden kept the train to a very low rate of speed for 2½ miles, and lost 4¾ min., after which there was an acceleration up 1 in 330 from 20 to 66 m.p.h., and further to 74 at Watford; a steady 70½ m.p.h. was then maintained up the subsequent 1 in 330 until a severe bridge reconstruction slowing at Hemel Hempstead, the engine afterwards recovering up the grade to 61 m.p.h. before Tring. Owing to the three delays, together costing 6¾ min., the time from Euston out to Tring, 31·7 miles, was 39 min. 35 sec. But the next 23·1 miles, to Castlethorpe, were covered in 17 min. 21 sec., at an average of 80 m.p.h., speed rising to 83½ m.p.h. beyond Cheddington, at Bletchley and at Wolverton. A notable feat was the minimum of 74 m.p.h. on the ascent to Roade much of which is at 1 in 330. So Bletchley, 46·7 miles, was passed in 50 min. 51 sec., and Roade, 59·9 miles, in 61 min. 8 sec., or 54½ min. net. A special stop was made at Blisworth to set down Dr. Burgin, the 62·8 miles taking 65 min. 9 sec., start-to-stop, or 58½ min. net.

Praiseworthy efforts were then made to recover the lost time, the 19·8 miles from Blisworth to Rugby being run in 20 min. 4 sec., start-to-stop, with speeds of 74 m.p.h. at Weedon, 65 on the rise to Kilsby tunnel, and 79 at Hillmorton; Rugby, 82·6 miles from Euston, was reached in 85 min. 59 sec., all delays included, or 74½ min. net. Arrival and departure from Rugby were both 6 min. behind time, and all the arrears would have been regained by Crewe but for an unfortunate signal check between Tamworth and Lichfield, which nearly stopped the train and cost 3¼ min. Speeds were 80½ m.p.h. at Nuneaton, 68 at Atherstone, 77½ at Polesworth, and, after the check, 79 at Rugeley, a slack to 44 at Stafford, 64 over Whitmore, and 82 at Betley Road. Nuneaton, 14·5 miles, was passed in 14 min. 35 sec., Tamworth, 27·4 miles, in 24 min. 55 sec., Stafford, 51·0 miles, in 48 min. 22 sec., Whitmore, 65·0 miles, in 62 min. 22 sec., and Betley Road, 70·8 miles, in 67 min. 12 sec. (64 min. net), Crewe, 75·5 miles, being reached in 72 min. 48 sec., or 69½ min. net. With this 355-ton train, therefore, the engine had covered the 158·1 miles to Crewe in a net running time of 144 min., 11 min. less than the Royal Scot schedule, and in the time allowance of the Coronation Scot streamliner. Meanwhile, Dr. Burgin had returnd to London on the footplate of the 8.30 a.m. ex-Manchester, which had been specially stopped at Blisworth to pick him up. Details of his homeward run will be found in the editorial note on page 530.

XUM



General arrangement drawing of Velox boiler locomotive



1. Combustion chamber
2. Evaporator pipes
3. Steam separator
4. Superheater tubes
5. Steam collector for superheated steam
6. Oil burner
7. Steam turbine
8. Gas turbine
9. Air compressor
10. Electric motor
11. Steam turbine
12. Gearing
13. First stage feed water pump
14. Second stage feed water pump
15. Water circulation pump
16. Fuel oil feed pump
17. Lubricating oil circulation pump
18. Electric motor
19. Primary fuel oil filters
20. Secondary fuel oil filters and oil pre-heater
21. Air-oil mixture regulator
22. Lubricating oil cooler
23. Condenser for auxiliary groups
24. Water pre-heater
25. Regulator valve
26. Decanters

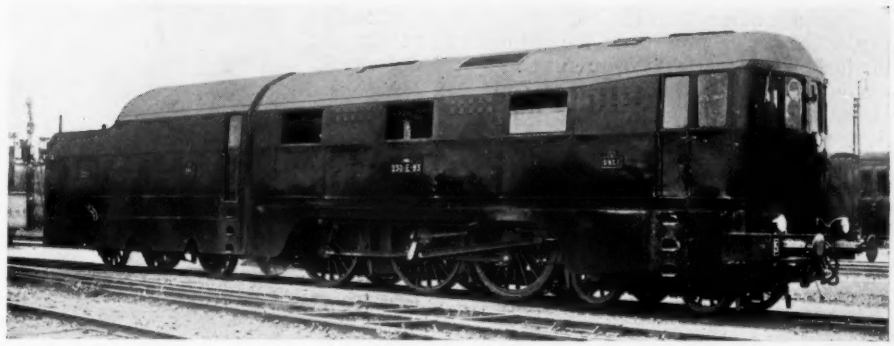
Diagram of arrangement of Velox boiler and auxiliaries

4-6-0 *LOCOMOTIVE NO. 230.E.93. FRENCH NATIONAL RAILWAYS. FITTED WITH VELOX BOILER*

FRENCH LOCOMOTIVE WITH VELOX BOILER

Further particulars are given of an interesting experimental conversion now undergoing track tests

REFERENCE has already been made in these pages to the experimental French locomotive with the Velox generator.* This locomotive is now under test in the South Eastern Region of the French National Railways. So that the tests should reveal the advantage of the Velox generator over an ordinary boiler, the machine is a reconstructed 4-6-0 steam locomotive from which only its original boiler was removed. The driving mechanism was left unchanged so that any improvement in the output of the machine would be due solely to the changed boiler.



Locomotive No. 230.E.93, French National Railways, the rebuilding of which with a Velox steam generator in place of the orthodox boiler has increased its power by a third

The combustible used is fuel oil, burned in an enclosed combustion chamber (1), in the diagram opposite, under a pressure of 35 lb. At this pressure it is possible to obtain exceptionally high output in a very confined space. It also permits the burned gases to be passed along the evaporator and superheater tubes at very high speeds. About 200 m.per.sec. is the speed attained, and this gives a coefficient of heat transmission about ten times that found in an ordinary locomotive, so that to obtain the same amount of steam, the surface of the tubes need be only one tenth that of the ordinary locomotive.

In order to reduce heat losses, the evaporator (2) and superheater (4) tubes are arranged round the cylindrical combustion chamber (1). A water jacket is provided at each end of the chamber so that no insulation is necessary, all the heat going directly into the water.

The pressure necessary for the operation of the generator is obtained with almost no added expenditure by using the heated gases from the combustion chamber (1) to operate a turbine (8) which drives the air compressor (9). This turbine lies in the gas circuit between the superheater and the chimney and permits an almost total recuperation of both the pressure of the burned gases and their heat. A small steam turbine (7) is fixed on the same shaft as the gas turbine, but this is used only when it is necessary to increase the output of the boiler. Starting, when there is neither steam nor heated gas, is obtained by means of the electric motor (10), also on the same shaft.

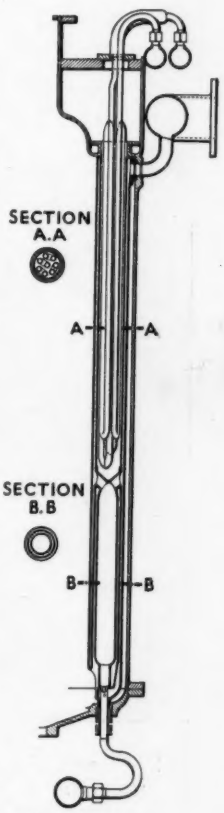
The compressor is of the axial flow type, and the turbines work on the multistage reaction principle. The whole group is designed to operate at temperatures well above 550° C.

Water circulation is forced as well as gas circulation in order to permit a proper exchange of heat. A circulation pump (15) used for the purpose takes water from the bottom of the steam separator (3) and forces it through the evaporator tubes, whence it flows back into the separator. The output of the pump (15) is about ten times the amount of water which can be evaporated by the generator, so that the water returns to the separator in the form of a water-steam emulsion. This is injected tangentially into the separator, and the centrifugal force of the injection separates water from steam. The water drops to the bottom of the separator while the steam occupies the top.

Automatic regulation is obtained through a series of three regulators. One of these is placed on the steam supply after the superheater, and serves to regulate the supply of fuel oil to the combustion chamber in such a way that the pressure of steam coming from the superheater will remain constant, no matter what the demand may be. A second regulator (21) controls the mixture of air with oil, acting on the turbo-compressor group so as to provide a sufficient supply of air at all times. The third regulator is placed on the separator and serves to open the feed water valves whenever the separator water level drops.

The generator used is designed for a production of 12 tons of steam per hour, of which 11 tons are used for driving the locomotive and the remaining one ton for the operation of the various auxiliaries (air compressor, water circulation pump, &c.). Pressure of the steam is about 285 lbs. per sq. in., and the temperature after superheating is 716° F. (380° C.).

Fuel and lubricating oil circulation are both operated by a steam turbine (11). This turbine is connected by shafts and gearing so that it drives not only



Details of an evaporative element of the Velox boiler

* THE RAILWAY GAZETTE of November 25, 1938 (pp. 895 and 910)

the two feedwater pumps (13, 14) but also the water circulation pump (15), the fuel oil feed pump (16) and the lubricating oil circulation pump (17). Connected to this same group of shafts and gears is an electric motor (18) used during starting up and when there is no steam pressure.

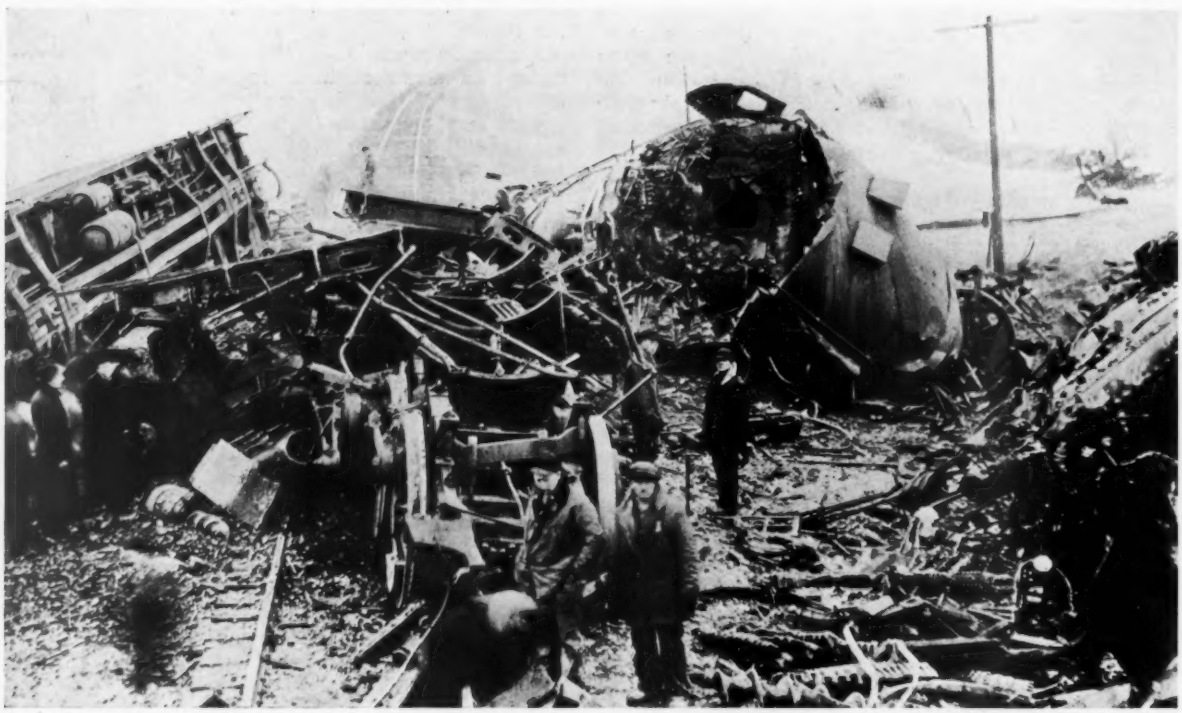
Current for this motor, as well as for the electric motor on the air compressor shaft, is provided by a diesel-electric generator placed in the tender of the locomotive in the space normally occupied by coal. The tender also carries the water required in the normal water tank, and the fuel oil in a special tank installed above the water tank.

The whole Velox installation was built on the chassis of the locomotive by fixing it to a very rigid baseplate, riveted to the main frames. This baseplate is calculated to resist any torsional stresses which may be introduced when raising the locomotive, and so to avoid distortion of the generator elements. The weight of the whole generator installation is 18 tons.

On account of the smaller size of the elements of this generator, it has been possible to instal them in the centre of the baseplate and leave a corridor at each side which gives access to the parts even when the locomotive is running. The driver's cab is at the front of the locomotive, and the controls are electrically operated. A small electric motor with push-button control actuates the regulator and reversing gear in place of the normal lever control. (*See editorial comment on page* 529.)

Front view of Velox boiler locomotive, S.N.C.F.

A Runaway Engine Collision



The result of a collision on February 19 between a runaway light engine and a passenger train on the Chicago Great Western Railroad. The engine was shunting at Tennant, Iowa, when a wagon which it had backed on to a train failed to couple up, started forward and struck the engine violently as it was placing another wagon in a siding. The impact broke some steam pipes and flooded the cab with steam, forcing the crew to jump off. The driver having in his haste left the regulator open, the engine ran away four miles downhill until it met a passenger train head-on. The driver and fireman of the passenger engine were killed and eleven passengers injured

NEW PASSENGER STOCK, NEW ZEALAND RAILWAYS

Features of new composite day and sleeping cars are partial air-conditioning, adjustable seats, and anti-telescoping ends

SEVERAL composite day and sleeping cars of a type specially suited to New Zealand conditions have recently been completed at the railway workshops in both the North and South Islands. The sleeping portion of these cars consists of five two-berth compartments, one of them being larger than the others, namely, 7 ft. $0\frac{3}{8}$ in. long, and furnished with movable easy chairs and a card table in addition to the usual fittings.

First class day compartment in the New Zealand Government Railways composite day and sleeping car. The seating, with adjustable backs, is of a type designed and constructed by the railway administration

Each sleeping compartment is equipped with a wash basin, supplied with hot and cold water, and other fittings include coat hooks, and water bottle and tumbler holders of artistically shaded Roanoid to match the walls. Folding trays are provided, of which the inner sides are covered with Artoco, and the outer sides with Rexine of the same colour as the walls. Both the top and bottom bunks are fitted with Hairlok mattresses.

The first class day compartment seats 11 passengers. The seats are of the latest revolving bucket type—with the backs adjustable to four positions—invented and patented in New Zealand; they are upholstered in two-tone brown leather, covering Hairlok units in the backs, and Dunlopillo units on the seats. Folding trays are provided on the seat backs. Two lavatories are provided, one for the day compartment passengers, and one for the sleeping berth passengers. The lavatories are finished throughout with green and white mottled Artoco, and with silver Rexine ceilings and rubber floors. Rexine is used for walls and ceilings throughout the car.

Fresh air for ventilation is taken in through a louvre in the side of the car, and forced by a motor-driven fan through filters, which extract all dust and impurities. It then passes through two heating coils, which are regulated by thermostats placed, one in the air duct and one in the compartment, and is delivered to the compartments through grilles in the ceilings. The air passes out through louvres in the bottoms of the compartment doors, thence through the louvres in the lavatory doors, and so to the atmosphere through roof ventilators in the lavatories. The compartment thermostat is set to maintain a predetermined temperature, and operates the steam regulating valves to the heating coils according to requirements. The capacity of the ventilating fan provided in each car is 2,000 cu. ft. of air a minute. This ventilating plant is supplied by Taylors Limited, Christchurch.

The space between ceiling and roof is insulated with aluminium foil or asbestos spray, and the same materials are used on the interior surface of the outside steel panels of the car and on other parts of the vehicle. A dressing of white enamel paint is applied to the car roof as a further means of heat-resistance.

All the notices in these cars are of a new design made of Traffolyte. Automatic couplers, vestibules connecting with adjoining cars, and anti-collision ends, are features of the cars. The roofs are of copper-covered Flexometal plywood, and the side panels of copper-bearing steel. All windows are of toughened glass. The underframes are fitted with the usual gear which is now standard equipment for the department's new passenger rolling stock, namely, Stone's electric lighting equipment, Westinghouse water-raising equipment, and Westinghouse brake. The bogies are of the latest roller-bearing type.

B.S.S. FOR MILD STEEL LIFTING SHACKLES.—A further specification forming one of a series of British Standards for terminal fittings for chains and wire ropes has recently been issued by the British Standards Institution. Copies of the new specification (B.S. No. 825) can be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d. post free.

XUM

AN UP-TO-DATE FOUNDRY

The steel and iron foundries of Babcock & Wilcox Limited at Renfrew have been completely reconstructed and there is a well equipped research department

THE name of Babcock & Wilcox is one of that select number which, originating in a humble way in these islands, have become almost household words, representative of engineering excellence, all over the world. A recent visit to the firm's works at Renfrew, especially for the purpose of seeing the new foundries, confirmed that the international reputation of Babcock & Wilcox Limited is in no danger of flagging.

The main products of the Renfrew factory are steam raising equipment—including, of course, the famous B. & W. watertube boiler—iron and steel castings used in connection therewith, as well as for outside firms, and cranes of every kind.

A complete reconstruction of the steel foundry, which occupies nearly 30,000 sq. ft., was completed in 1938, and about 1,000 tons of carbon steel and 150 tons of special alloy steel finished castings a year are turned out. Almost any special steel can be produced, but Calmet—which is particularly associated with the Calorizing Corporation of Great Britain Limited—accounts for a good proportion; this is a nickel-chromium heat-resisting alloy widely used for boiler furnace and stoker parts as well as for metallurgical furnaces. The melting furnaces are electric, with basic linings and automatic electrode control. Both machine and hand moulding are used and there is a special core-making section. Great attention is paid to the sand treatment. Risers are cut-off the castings is by cold saw, which eliminates local heating, and sandblasting is followed by suitable heat treatment.

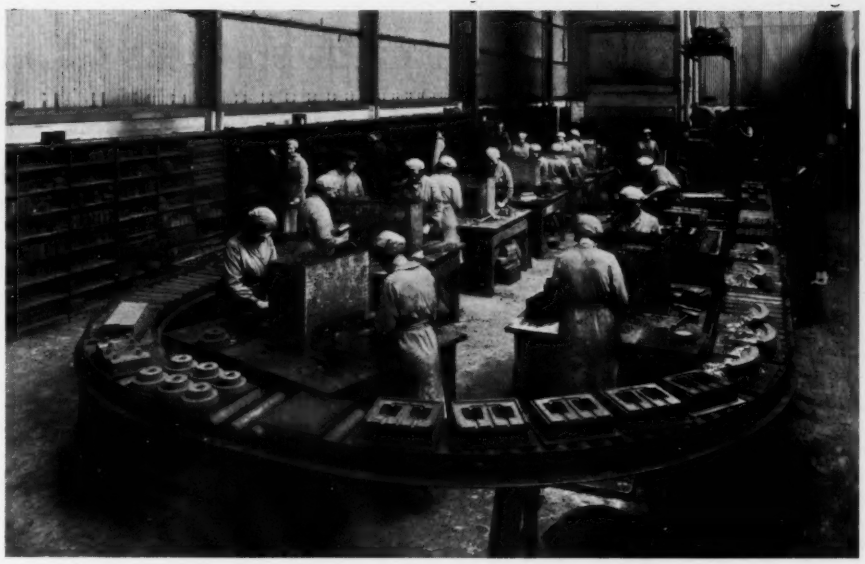
Rebuilding—completed in 1938—is also the latest phase of history in the iron foundry, which occupies over 130,000 sq. ft. From this department no less than 21,000 tons of finished castings are despatched a year, not only of normal B.S.S. grades but also including many special mixtures giving wear-resisting and heat-resisting qualities, as well as malleable-iron castings. For this output well over 3,000 moulds are made each working day, only about a sixth by hand, apart from the 5,500 to 6,000 moulds a day required by the continuous casting plant, which is one of the most interesting features of the plant. For the latter duty there are nine hydraulic squeeze moulding machines designed and made within the B. & W. organisation. By working this plant on two shifts it

Left: Iron foundry melting units, with charging floor above

Left: Charging crane for cupolas, available to feed the four melting units. Right: General view of continuous casting plant

would be possible to produce from it about 270,000 castings a week.

Of the five cupolas comprising the melting unit four operate on the balanced draught system. The layout for preparing metal charges has been ingeniously designed to facilitate the accurate weighing of each component of the charge so as to give a very uniform quality of product. The cupola charges are weighed into self-discharging vessels, which are lifted by a special charging crane and deposited within the cupola. As in the steel foundry, sand preparation is given very keen attention, there being a foundry sand-testing laboratory whose constant care is to ensure that the permanent equipment is functioning as its optimum. The core shop is a good example of straight-line production and is "manned" by 25 girls, whose daily output is approximately 6,000 cores.



Mechanised core-making department with drying stove in background

Research Laboratories

Each step in the production processes undertaken in the foundries is, of course, checked and counterchecked by expert workmen, inspectors, and testers. For this purpose, and for the control of the various other production processes of the firm, as well as for research, there is at Renfrew a well organised and directed laboratory comprising three main sections, *viz.*, mechanical, metallurgical, and fuel. In addition the research department has at its disposal a high-pressure steam testing laboratory in which new developments are tried out in service conditions; this includes a boiler capable of an output of about 40,000 lb. of steam an hour at 1,575 lb. per sq. in., complete with a fully equipped control and instrument room. There are also two independently fired superheaters, through which steam at pressures up to 1,400 lb. per sq. in. is passed and by means of which life tests of different materials can be carried out in practical conditions.

The mechanical section is divided into two parts, one dealing with research problems proper and the other with routine testing. It has its own machine shop for the preparation of specimens and the manufacture of special apparatus, and is provided with tensile, impact, hardness, torsion, and fatigue testing machines as well as heat-treatment furnaces and other more special equipment. An investigation was recently conducted here in collaboration with the Welding Research Committee of the Institution of Mechanical Engineers on the fatigue reactions of three welded boiler drums. In the metallurgical section there are routine and analytical laboratories, and the work includes inorganic and metallurgical analyses, electrolysis research and investigations on complicated alloys. There is also a metallographic section, handling microscopic work for both routine and other investigations. In the fuel section routine work includes the examination of fuel samples in connection with projected or completed boiler plants and the testing of any works plant involving combustion problems.

Besides the Renfrew plant, Babcock & Wilcox Limited has at Dumbarton a valve works, calorizing department, and tube mill. Other interests of the firm are the works of Edwin Danks & Co. (Oldbury) Ltd., at Oldbury, where cylindrical boilers, heat-exchangers, and both heavy and small pressings, &c., are produced; the Clarkson Thimble Tube Boiler Co. Ltd., which markets a very efficient exhaust heat and fuel fired boiler of special design; Erith's Engineering Co. Ltd., supplying stokers for flue-type boilers and retort-stokers for water-tube units; Spencer-Bonecourt Limited providing waste-heat boilers with special reference to steelworks and the carbonising industries; and others, not to mention affiliated firms overseas.

L.N.E.R. Refreshment Rooms Reconstruction

The L.N.E.R. station refreshment rooms at Harrogate are to be modernised under the company's 1939 programme. A modern restaurant and tea room, accommodating 50 people, is to be provided and the alterations include the provision of a large general refreshment room for the service of liquors, beverages and light refreshments, with a new counter and fittings, cooling plant and other modern equipment. A new kitchen will be installed and will be fully equipped with modern apparatus and refrigeration to ensure that the preparation and service of food is performed under the most hygienic conditions. The new premises will be tastefully decorated and refurnished throughout and will have the advantage of natural lighting during the day and improved electric lighting at night. At Scarborough station the refreshment room has been enlarged and equipped with a new counter, fittings and cooling plant, and a section of the room has been converted into a new tea room with accommodation for 40 people. The restaurant, which has access from the main street as well as from the station platform, has also been modernised and has been provided with accommodation for 80 diners. The premises have been redecorated and refurnished, electric lighting and central heating being installed. The kitchen, larder, service room and scullery accommodation have been enlarged and brought up to date with modern equipment.

XUM

THE DAYLIGHT EXPRESS AND ITS LOCOMOTIVES

Twenty 4-8-4 locomotives capable of exerting over 75,000 lb. tractive effort have been built by the Lima Locomotive Works for the Southern Pacific Railroad, and work the streamlined Daylight and other expresses over the heavy grades between San Francisco and Los Angeles

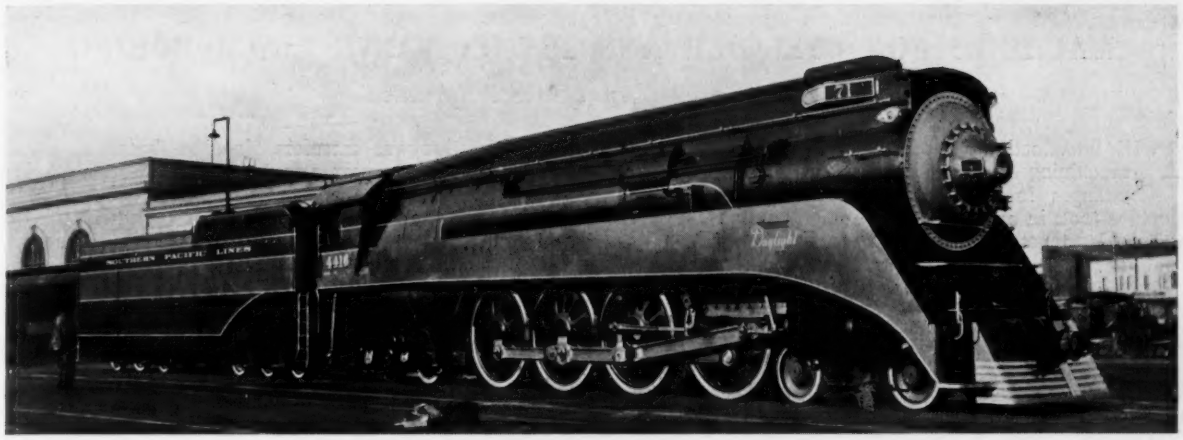
BEFORE giving details of these very powerful engines, it may be as well to realise the exacting work for which they are designed, and the trains they have to haul.

The Daylight expresses leave both San Francisco and Los Angeles at 8.15 a.m., and make the journey of 471 miles in each direction in 9¾ hr., at an overall average speed of 48·3 m.p.h., including five intermediate stops, arriving at 6 p.m. This average is considerably more meritorious than might appear at first sight, as gradients as steep as 1 in 46 are encountered at certain points, and there are lengthy stretches inclined at 1 in 100 to be negotiated with trains having a standard formation of 12 cars weighing 510 long tons tare. The intermediate stops southwards from San Francisco are San Jose (47 miles), Salinas (115 miles), San Luis Obispo (248 miles), where engines are changed, Santa Barbara (367 miles), and Glendale (464 miles), a suburb of Los Angeles; the longest non-stop run is thus the 133 miles from Salinas to San Luis Obispo. Of this stretch the 109 miles between Salinas and Atascadero are booked to be covered in 111 min. southbound and 110 min. northbound, and several shorter sections are scheduled at pass-to-pass speeds up to 70 m.p.h., which is considerably faster than anything previously attempted with steam in California.

The equipment of the train includes Pullman and chair cars, and the variety of refreshment service that is now a typical feature of long-distance American travel. This entails a dining car for *table d'hôte* and *à la carte* meal service, "coffee shop" serving a wide variety of inexpensive meals at prices from 30 to 75 cents (1s. 3d. to 3s.), and a "tavern" which, as its name implies, is designed as a lounge for the service of drinks in "the atmosphere of good fellowship." All seats on the train must be reserved in advance.

During the past year or so the 20 engines have been delivered in two batches. The first 6, which were briefly described in our issue of January 22, 1937, differ from the later 14, in which the driving wheels have been increased in diameter from 6 ft. 1½ in. to 6 ft. 8 in., the cylinder stroke from 30 in. to 32 in., and the firebox heating surface from 350 to 385 sq. ft., while the cylinder diameter has been reduced from 27 in. to 26 in. Also the working pressure of the later batch has been increased from 250 to 280 lb. per sq. in. Outwardly the engines have a very striking appearance, the smokebox front

The Daylight express, Southern Pacific Railroad



One of the 6 ft. 8 in. 4-8-4 locomotives used for hauling the Daylight express between San Francisco and Los Angeles

having a bright aluminium finish, and the apron or cow-catcher being in an orange shade which sweeps in a broad band round the side of the locomotive and tender, and down the full length of the Daylight train, with deep crimson bands above and below, and white lining. The remainder of the locomotive has a black finish, with bright motion and wheel-rims. All 20 engines of this type have a tractive effort of 63,230 to 64,350 lb., at 85 per cent. working pressure, which can be increased at starting or on rising gradients to 75,740 and 76,550 lb. by auxiliary booster equipment.

The following are the principal dimensions of these fine engines:—

	First 6 engines	Later 14 engines
Cylinders, dia.	27 in.	26 in.
,, stroke	30 in.	32 in.
Piston valves, dia.	12 in.	12 in.
,, ,, max. travel	7½ in.	7½ in.
Coupled wheels, dia.	6 ft. 1½ in.	6 ft. 8 in.
Wheelbase, coupled	20 ft. 0 in.	21 ft. 6 in.
,, engine, total	45 ft. 10 in.	47 ft. 8 in.
,, engine and tender	94 ft. 0 in.	95 ft. 10 in.
Evaporative heating surface—		
Tubes and flues	4,502 sq. ft.	4,502 sq. ft.
Firebox	350 sq. ft.	385 sq. ft.
Total	4,852 sq. ft.	4,887 sq. ft.
Superheating surface	2,086 sq. ft.	2,086 sq. ft.
Combined total	6,938 sq. ft.	6,973 sq. ft.
Firegrate area	90·4 sq. ft.	90·4 sq. ft.
Boiler pressure, per sq. in.	250 lb.	280 lb.
Tractive effort (at 85 per cent. working pressure)—		
Without booster	63,230 lb.	64,350 lb.
With booster	75,740 lb.	76,550 lb.
Adhesion weight	119 tons	119¼ tons
Weight of engine, in working order	200 tons	205¼ tons
Weight of tender, in working order	166½ tons	166½ tons
Weight of engine and tender, in working order	366½ tons	371¾ tons
Tender—		
Water capacity U.S. gal.	22,000	22,000
Fuel-oil ,, U.S. gal.	6,010	6,010

The external diameter of the boilers of both batches tapers from 7 ft. 2 in. outside the first ring to 8 ft. 0 in. maximum external diameter, and the length between tube plates is 21 ft. 6 in. The firebox, which is fitted for oil burning, includes a combustion chamber extending 5 ft. 0 in. in the earlier, and 6 ft. 8 in. in the later engines, into the boiler barrel. Welding was extensively used in the construction of the firebox. Equipment includes Flannery flexible staybolts, E-type superheater and tangential drier, Worthington feedwater heater, Boxpok type wheels with Alco lateral cushioning of the front coupled axle and power reversing gear. Rods and motion and axleboxes are grease lubricated. The tender is carried on two six-wheel bogies.

The Southern Pacific Railroad claims that the Daylight is the most heavily patronised one-section long-distance daily train in the world. During its first year of working the north- and south-bound trains carried a total of 253,573 passengers, an average of 695 a day, between San Francisco and Los Angeles.

"Italian" Coach for Southern Railway Boat Train

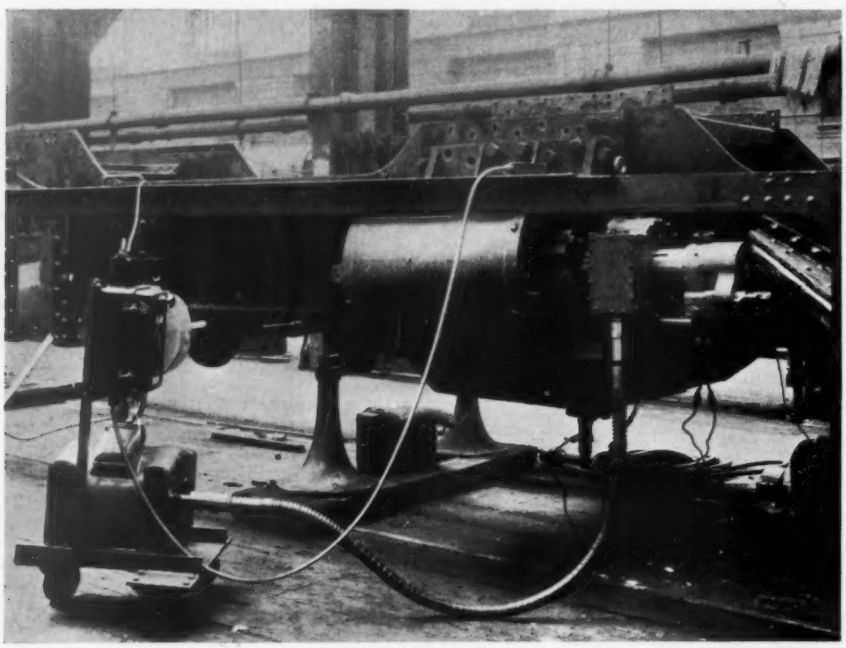
On Monday next, April 3, the Southern Railway will put into service on a Continental boat train a carriage that has been refitted and decorated on original lines. The principal novelty is the substitution for the more conventional types of railway carriage views of pictures taken from sketches made during a recent tour of Italy. They are the work of Miss Helen McKie. Architectural subjects, ranging from Venice and Bordighera to Rome and Naples, are represented in some of the pictures, whilst others are of types and uniforms which may be taken as characteristic of modern Italy. The sketches of the Swiss Guard were made, not without some little difficulty, in Vatican City. The artist has succeded in portraying the picturesque note of bygone days as well as the atmosphere of present-day Italy. The pictures have been assembled from the original sketches and redrawn on tinted paper specially selected to tone with the panelling and upholstery of the new coach, the artist having visited Lancing carriage works to ensure this effect. It is hoped that they will not only add to the attractiveness of the surroundings of passengers travelling to the Continent, but serve to pique their appetite for their holiday abroad. The practice of using an artist's work instead of the customary photograph for carriage decoration was introduced on the Southern Railway in 1936, when the company adopted some coloured etchings by the late Mr. Donald Maxwell. In this series the inspiration was the English countryside and architecture, as exemplified by the selection we reproduced in our issue of February 5, 1937.

XUM

MACHINES FOR CYLINDER AND PISTON VALVE LINER BORING

Details of modern L.M.S.R. practice

THE introduction of cemented carbide tools for the machining of metal has necessitated considerable changes in the detail design of many types of machine tools in order to provide suitable ranges of speeds and feeds, together with the necessary rigidity of construction. Machines for the re-boring of locomotive cylinders and piston valves occupy an important place in the machine equipment of main locomotive repair shops. Within the range of sizes, *i.e.*, 8-in. to 22-in. bore and 29-in. to 58-in. length, figures which include both cylinder and steamchest liners, the volume of re-boring work required to be done *in situ* in locomotive repair shops is probably without equal throughout the engineering industry. The number of cylinders and piston valve liners to be rebored annually totals 400 and 2,000 respectively at one large works. In view, therefore, of the better finish which it was expected could be obtained, and the fact that the completion in shorter time of a key operation such as re-boring would be advantageous in many ways, new designs of machines for this purpose were prepared, and the machines have recently been produced in the Derby locomotive works of the L.M.S.R.



New high-speed machine, operated by a.c. motor, boring cylinder of L.M.S.R. standard compound locomotive

The new high-speed machines are of two types, generally similar in design, each dealing with distinct duties. The larger machine is used for cylinder re-boring, and the smaller one for similar operations on piston valve liners. It was early realised in considering the designs that a motor of adequate power would be of such overall dimensions as to render impossible its being mounted on the boring bar unit, as machines for *in situ* work would have to be capable of being manœuvred in the close and sometimes very restricted positions frequently found in locomotive work.

Consideration was therefore given to the possibility of having the motor separate from the boring bar unit, and it was decided to use a flexible shaft of heavy type to transmit power from the motor. This permitted the use of a standard type electric motor mounted on a separate carriage, with the result that the weight and dimensions of the boring bar and gear unit are kept to a minimum. The motor carriage, which is mounted on roller-bearing castors, carries the necessary electric control gear, which for a.c. electrical supply incorporates a main switch with remote control, stop and start buttons on a flexible lead, and a change-pole switch for obtaining either of the speeds available. For d.c. supply the switchgear incorporates a starter and shunt-field speed regulator, while a stop button only is provided on a flexible lead.

Cylinder-boring Machine

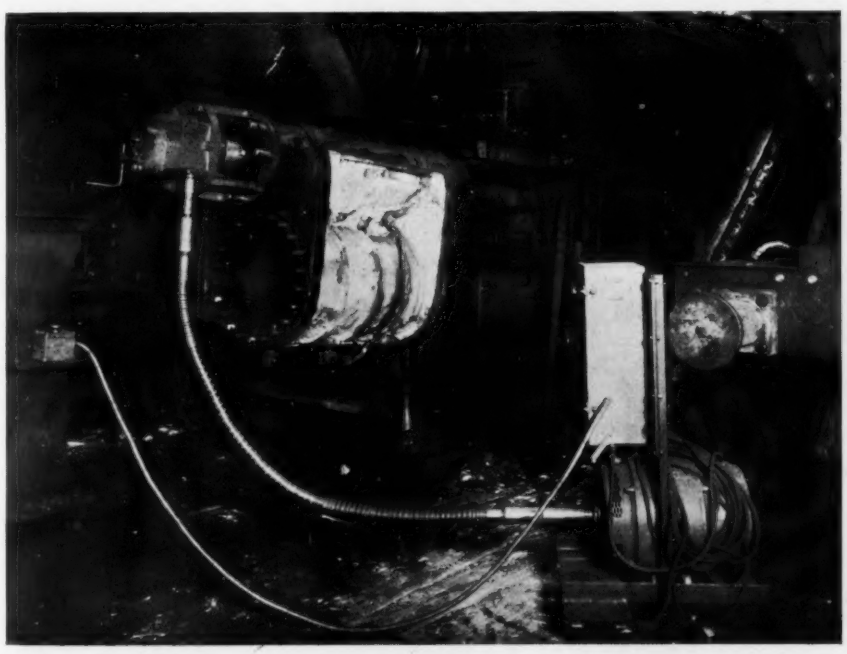
The design of the cylinder-boring machine is influenced by the fact that cylinders of varying lengths as well as diameters require to be rebored, and the former variations are catered for by arranging the bar to slide through the gear housing, a rack and pinion being provided to enable this motion to be carried out readily. The gear unit consists of a worm reduction having a ratio of 1 : 12½ for a.c. supply machines, and 1 : 16⅔ for those working off d.c. supply, using a four- or three-threaded worm respectively. One end of the worm spindle is of hexagonal section, and projecting from the gearbox it forms one member of the quick-coupling by which the flexible shaft is readily attached to the machine. The steel gear-housing is built up of plates, electrically welded and totally enclosing the worm gear. It is arranged to allow of attaching the machine by means of adaptors to the studs on the locomotive cylinder face. The adaptors, attached at the front or open end of the cylinder, are arranged to fit as many classes of cylinders as possible, only two pairs being necessary to cover the full range of stud circle diameters. Fine screw adjustment is fitted to the adaptors, enabling the bar to be centralised with accuracy and ease.

The bar and worm gears are mounted in ball and roller bearings, thrusts being taken by angular contact type ball bearings. The gears and bearings run in oil, but lubrication at other points is by grease gun through nipples. The steel bar itself is of 6-in. dia., but the end which passes through the stuffing box is necessarily reduced to 3-in. dia. and the overall length of the bar is 5 to 6 in. The feed screw, of 1¼-in. dia., is located off the centre of the bar to allow of the latter being as rigid as possible, and the half-nut of phosphor bronze assists in keeping the necessary housing slot of minimum depth. The gears providing the feed motion are mounted in part upon the

end of the bar, and also upon a bronze member which encircles the bar and which at the same time houses the racking pinion previously referred to. Although the feed screw is off centre the train of epicyclic-differential gears does not revolve eccentrically, nor does the winged friction-nut which engages the feed. This, it will be seen, is of considerable value to the operator when the speed of the bar is considered. Two rates of feed are provided and the provisions of only one friction nut which has to be transferred to an alternative spindle prevents any accidental double-engagement of feed gears.

Rotation of a detachable handle applied to the spindle upon which the friction nut is mounted, allows of hand feeding or returning the tool. It has also been arranged that upon the boring head coming into contact with the cylinder end or other obstruction, the friction nut becomes loosened and the feed is disengaged. Two boring heads are provided with each machine to cover the range of cylinders, and two tools are fitted in holders arranged diametrically opposite. The boring head can be removed from the machine by withdrawing one socket-head screw. Both tools which are cranked are normally in operation, the roughing one being set slightly in front of the finishing tool. Cuts up to $\frac{1}{8}$ in. deep for roughing and $\frac{1}{64}$ in. for finishing are carried out by the machine.

One of the tool holders is set at an angle in the boring head and is provided with a short feed screw, so that when required taper boring of the bellmouth can be done between the slightly larger diameter of the cylinder mouth and the bore proper of the cylinder. A star-wheel and striker operates this auxiliary feed motion, the main feed gear being disengaged, and a length up to $2\frac{1}{2}$ in. of taper can be bored at the normal cutting speeds of the machine.



New machine for piston valve line boring in operation on L.M.S.R. 2-6-4 tank locomotive

The bearing at the stuffing box end of the bar consists of a phosphor bronze split bush tapered on the exterior diameter and provided with a threaded portion and draw-nut. Varying diameters of stuffing boxes are covered by providing specially flexible steel split bushes which fit therein, and which are taper-bored to accommodate the phosphor bronze bearing bush. Cover plates are provided to pass over the various stud arrangements, and against this plate the draw-nut bears so that the taper bronze bush centralises the bar in the stuffing box at the same time as it provides a true running bearing for the bar.

The flexible shaft, which has a core diameter of 26 mm., is capable of giving long service, being provided with ball bearings at each end, and the casing is reinforced to prevent any kinking tendency under heavy or fluctuating loads.

The leading particulars of the cylinder boring machine are as follow:—

Diameters of cylinders machine will bore	16 in. min.	22 in. max.
Length of cylinders machine will bore	29 in. min.	36 in. max.
H.p. of motor (1-hr. rating)	5	
Revs. per min. of motor—		
A.c. 2-speed	710 and 940	
D.c. variable speed	900–1,200	
Revs. per min. of bar—		
A.c. 2-speed	56·8 and 75·2	
D.c. variable speed	54–72	
Feed per rev.	0·015 or 0·031 in.	
,, ,, (taper boring)	0·020 in.	
	A.c.	D.c.
Typical cutting speeds, ft. per min.—		
18 in. cyl.	354	300
20 in. ,,	297	300
21½ in. ,,	320	300
Cutting time per 12 in. length of cylinder (20 in. dia.—feed 0·031 in.)	= 6¾ in. min.	

Piston Valve Liner Machine

The machine for re-boring piston valve liners *in situ* is of the same design generally as that for cylinder boring, the independent motor unit and flexible shaft features being incorporated. The boring bar and gear unit are of lighter proportions, and simplification is possible because variations in the length of bar required cause no difficulty, as will be seen from the following description.

The gear unit consists of a high-efficiency worm reduction enclosed in a steel housing, also of welded construction. The reduction ratio is 1:8½ or 1:10⅓ according to the motor speeds available, which are similar to those previously described for the cylinder-boring machine. Ball bearings are utilised in which to mount the boring bar and worm gear, thrusts being taken by angular contact bearings. The steel boring bar is 4 in. dia. throughout, and the feed screw, which is 1 in. dia. is offset from the centre, a half-nut being used in order that the stiffness of the bar may be impaired as little as possible. The train of gears necessary to impart motion to the feed-screw is of epicyclic-differential type, mounted in part on the end of the boring bar, and in part on the gearbox cover; the whole train is totally encased. The wing-nut which causes engagement of the feed revolves about its own centre only, a very desirable feature in view of the speed of the bar. Hand feed and return of the boring head is effected by fitting a handle to the spindle upon

which the friction nut is mounted. In the case of a long return traverse being necessary, it is possible to do this quickly by applying the revolving end of the flexible shaft to this same spindle in place of the handle.

Only one boring head is provided, and by using tools of different lengths the full range of bores can be covered. Slots are provided for two tools diametrically opposite, and fine-screw adjustment allows of accurate setting to micrometer for boring to specified diameters. Straight tools are used, the shank section being ¾-in. square.

Adaptors of welded steel plate construction, heavily ribbed, are bolted to the circular back plate of the gear housing, a spigot thereon facilitating the setting in central position; and the adaptor in turn is secured to the steamchest by the studs ordinarily used for fastening on the cover. These adaptors have ports in them and are sufficiently long to enable tool changing and setting in the boring head to be carried out with ease when the machine is mounted on the engine. At the other end of the steamchest the bar passes right through a mild steel adaptor plate which is fitted to the steamchest studs, thus catering for different lengths of steamchests. To avoid scoring of the bar at intermediate positions where the boring head will, upon other occasions, be required to work, an accurately fitting steel sleeve is fitted to the bar. The sleeve has an internal key engaging in the feed-screw slot, and externally the sleeve forms the wearing surface and runs in a bronze bush mounted in the adaptor plate. The bush is tapered externally and is threaded at the small end, adjustment in the bearing being made by drawing the bush through the adaptor plate by a nut.

In boring, cuts of depth up to ⅛ in. can be taken if necessary, and as in some cases there is a distance between liners up to 12 in., it becomes profitable to stop the machine and so hand feed the boring head until the cut is again taken up. Although cutting speeds are comparatively high, no difficulty is experienced in passing over the bars forming the steam ports, and indeed although this might easily have proved to be the feature which would preclude the use of cemented carbide tools, early tests proved that no difficulty would normally arise.

The leading particulars of the piston valve boring machine are as follow:—

Diameter will bore	8 in. to 11¼ in.	
Length will bore	Up to 4 ft. 6½ in.	
H.p. of motor (1-hr. rating)	3½	
Rev. per min. of motor—		
A.c. 2-speed	710–940	
D.c. variable speed	900–1,200	
Rev. per min. of bar—		
A.c. 2-speed	83·56	110·6
D.c. variable speed	87·10	116·1
Feed per rev.	0·015 in.	
Typical cutting speeds (ft. per min.)—	a.c.	d.c.
8 in.	231	250
10 in.	228	250
11 in.	241	250
Cutting time per 12 in. length of liner (11 in. dia.)	= 8¾ in. min.	

We are indebted for the above particulars and the originals from which the illustrations were prepared to Mr. W. A. Stanier, Chief Mechanical Engineer, L.M.S.R.

The Pan Americano express of the Central Argentine Railway hauled by 4-6-2 three-cylinder locomotive No. 1113, built by Armstrong Whitworth and equipped with Caprotti valve gear. A locomotive of the same type hauled the record-breaking El Cordobes on March 5, referred to in our editorial note on page 531

RAILWAY NEWS SECTION

PERSONAL

On Monday next (April 3), Mr. T. E. Thomas, at present General Manager (Road Transport), London Passenger Transport Board, will take up the appointment of General Manager (Operation). He will thus be responsible for the whole of the board's services, both rail and road. An editorial note on the appointment appears on page 529.

Mr. C. R. S. Harris, who is retiring from the position of Director-General of the Buenos Ayres Great Southern and Western Railways, has been appointed a Director of the Central Uruguay, Entre Rios, and Argentine North Eastern Railways, and of the Buenos Ayres Southern Dock, Bahia Blanca Waterworks, and Argentine Lands and Industries Limited.

Major O. Loewenthal has been appointed General Manager of the Buenos Ayres Great Southern and Western Railways.

Mr. Richard J. Howley, Director, Buenos Ayres & Pacific Railway, arrived in Buenos Aires on March 8, on a business visit.

Sir Ronald W. Matthews, Chairman of the L.N.E.R., has accepted a seat on the local board of directors for Yorkshire and Lancashire of the Legal & General Assurance Society, and has consented to act as Chairman.

The Southern Railway announces that Mr. E. T. Stanley, the company's Horse Superintendent, Bricklayer's Arms, retires today (Friday). From April 1, the Horse Department will be placed under the control of the Traffic Manager, and will be amalgamated with the Road Transport Section of the Office of the Superintendent of Operation, Waterloo.

We regret to record the sudden death on March 26 of Mr. C. A. Warner, Stationmaster at Slough, Great Western Railway. During the war Mr. Warner was Assistant Stationmaster at Paddington.

Señor Eduardo Alfonso, General Manager of the Madrid Zaragoza & Alicante Railway, has been designated (according to the *Boletin Oficial* of Burgos of March 10) as a member of the Railway Commission created by Order of November 27, 1936.

Mr. Theodore Eastaway Thomas, who as recorded on this page has been appointed General Manager (Operation), London Passenger Transport Board, was born in 1882 and educated at Battersea Grammar School; he entered the drawing office of the London United Tramways in 1899, and two years later was engaged in the electrification work under the late Sir J. Clifton Robinson, then Managing Director. Later he was appointed Resident District Engineer, and as such was concerned with construction and maintenance work until 1910. At that time the London United Tramways came under the administrative control of the Underground group, and Mr. Thomas was transferred to headquarters to deal with publicity and traffic work for the group. In 1913, consequent upon the group securing control of the London General Omnibus Company, he became Commercial Assistant, dealing with fares and routes, and, in 1915, Commercial Superintendent. In consequence of a public advertisement he was selected in competition as Development Superintendent of the London County Council Tramways, which service he joined in 1917. He became Traffic Manager in 1925, and in 1930 succeeded Mr. J. K. Bruce as General Manager, having previously assisted Mr. Bruce in the strenuous task of placing the L.C.C. Tramways undertaking on a firm financial basis. In 1933, on the formation of the London Passenger Transport Board, Mr. Thomas was appointed General Manager, Tramways (Central, Southern, and Eastern Areas), and in October of the same year became General Manager of all the London Transport tramways. In 1936 Mr. Thomas was appointed to the position he has held up till now of General Manager (Road Transport), in control of the board's buses, trams, and trolleybuses. He is a Foundation Member, Gold Medallist, and Vice-President of the Institute of Transport, and is Chairman of the Tramways, Light Railways, and Transport Association.

Mr. T. E. Thomas

Appointed General Manager (Operation), London Passenger Transport Board

It was announced on February 20 in the Canadian House of Commons at Ottawa that Mr. James Y. Murdoch, a Director of the Canadian National Railways, has resigned from his position on the board of the company.

Institution of Locomotive Engineers

The following members were elected at a meeting of the council of the institution on March 22:—

Members

Mr. W. T. Dixon, Chief Draughtsman, Nigerian Government Railway.

Mr. C. E. Fairburn, Deputy Chief Mechanical Engineer and Electrical Engineer, L.M.S.R.

Dr. A. McCance, Director and General Manager, Colvilles Limited.

Mr. H. M. Walker, Senior Assistant, Fuel, North Western Railway (India).

Associate Member to Member

Mr. H. J. Castle, Progress & Planning Officer, Bulawayo.

Associates

Sr. Pedro Cepero, chief Storekeeper (Sectional), B.A. Provincial Railways.

Mr. D. B. H. Hinchen, Technical Manager, Bombay, Alfloc Limited.

Associate Members

Messrs. W. Ingledew, Buenos Aires Provincial Railways; J. V. Livesey, Heatley & Gresham Limited, Calcutta.

Mr. S. P. J. Fry, Principal Assistant to the Chief Engineer, Rhodesia Railways, has been appointed Assistant Chief Engineer.

Mr. Yosuke Matsuoka, Chairman of the South Manchuria Railway since

1933, has tendered his resignation to the Japanese Government.

Mr. E. E. Painter retires today, March 31, from the post of Secretary to the Railway Clearing House. As recorded in our issue of December 30, 1938, he is succeeded by Mr. J. E. T. Stanbra. Mr. Painter's service at the Clearing House extends over a period of 49 years, he having entered the Mileage Department of the establishment in August, 1890. He was transferred to the Secretarial Department in 1894, and became confidential clerk to the then Secretary, Mr. Harry Smart. Mr. Painter was appointed Secretary to the Metropolitan Conference in July, 1911, the Imported Goods Examination in February, 1916, and the Continental Through Rates Conference in 1921; the two last-named conferences were merged and designated the Continental Traffic Conference in October, 1923. During the period from August, 1914, to August, 1921, when the railways were under Government control, Mr. Painter, as Assistant Head of the Secretarial Department, was in charge of the work performed at the Clearing House on behalf of the Railway Executive Committee. In January, 1920, he became Head of the Secretarial Department and Principal Assistant to the Secretary. In 1925, the Mileage Department dealing with the mileage and demurrage of railway stock and the common-user of wagons and sheets was merged into the Secretarial Department and placed under Mr. Painter's control and, following the sudden and unexpected death of Mr. P. H. Price, in April, 1935, he was appointed Secretary. Mr. Painter is a Member of the Institute of Transport and is at present a Member of Council of the institute.

Mr. E E. Painter

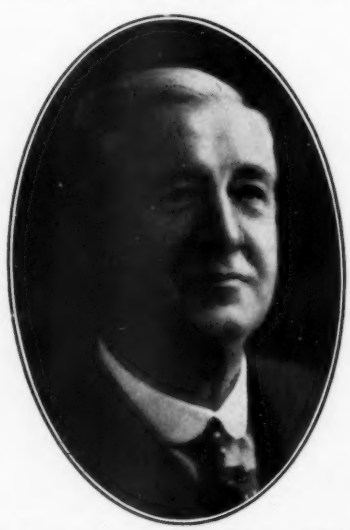
Secretary, Railway Clearing House, 1935–39

Mr. E. Rawdon Smith, since 1935 Public Relations Officer, London Passenger Transport Board, has been appointed Public Relations Officer, Imperial Airways Limited, and will take up his new duties on April 17. Mr. Rawdon Smith, who is 48 years of age, was educated at St. Edward's School, Oxford, the Sorbonne, Paris, and Queen's College, Oxford, where he took an Honours Degree in Law. Called to the Bar in 1912, he was attached until 1914 to the Northern Circuit. At the outbreak of war, he was commissioned to the Rifle Brigade, served in France in 1915, and was invalided home the same year. In 1917, he joined the Recruiting Department of the War Office, and, on its formation, the Ministry of National Service. Later, he was appointed Assistant Secretary of the Ministry of National Service, Secretary to the Council of the Ministry, and Secretary of the Labour Supply Sub-Committee of the War Cabinet. In 1918, his exceptional administrative qualities gained for him the O.B.E. Back in civil life, he became Secretary of George Spencer Moulton & Co. Ltd., and its associated companies in 1919, and remained with the organisation until 1926, when he went to Australia to supervise the affairs of A.E.C. (Australia) Proprietary Limited. In 1927, he became Secretary and Treasurer of the Associated Equipment and Associated Daimler Companies. A year later he was appointed Assistant Secretary of the Underground Electric Railways group of companies and its subsidiary companies. For a time he held also the appointment of Staff Officer to the same companies. When, in 1933, the London Passenger Transport Board was formed, Mr. Rawdon Smith was appointed Assistant Secretary to the board, and in 1935, he became Public Relations Officer, the post from which he will go to take up his new appointment.

Mr. E. Rawdon Smith, O.B.E.

Appointed Public Relations Officer, Imperial Airways

Mr. J. W. Davidson, C.M.G., whose recent death in Brisbane was recorded in our issue of March 24, was born in Glasgow and entered the service of the Queensland Government Railways in 1890 as a junior clerk. Promotion was rapid; by 1907 he had risen to be the Traffic Accountant. For some years he was also Traffic Superintendent of the Southern Division. In 1918 he re-visited the United States of America, where he had been as a young man, to study railway affairs, and on his return he undertook the task of reorganising the system of management of the Queensland railways, introducing the divisional instead of the departmental system. He was appointed Commissioner for Railways in 1918, a position which he



The late Mr. J. W. Davidson, C.M.G

Commissioner for Railways, Queensland, 1918-39

held until his retirement in May, 1938. During Mr. Davidson's term of office 1,000 miles of new line were opened for traffic, and the annual revenue increased by £3,000,000. He was awarded the C.M.G. in recognition of his long and valuable service in 1932.

G.W.R. Appointments

The following appointments are announced by the Great Western Railway:—

Mr. M. MacDonald, Assistant (Electrical), Swindon, to be Electrical Assistant to Chief Mechanical Engineer, Swindon, from April 29, *vice* Mr. J. R. W. Grainge, who is retiring.

Mr. W. H. Bodman, Assistant Divisional Locomotive Superintendent, Cardiff, to be Divisional Locomotive Superintendent, Cardiff, from April 7, *vice* Mr. C. T. Hurry Riches, who is retiring.

Mr. A. W. J. Dymond, Assistant to Divisional Locomotive Superintendent, Cardiff, to be Assistant Divisional Locomotive Superintendent, Cardiff.

Mr. S. F. Major, Surveyor and Estate Agent's Office, Paddington, to be District Estate Agent, Bristol, from April 1.

It was announced at the annual meeting of the North-East Coast Institution of Engineers and Shipbuilders on March 10 that H.M. the King had been pleased to become Patron of the institution. The late King George V was Patron of the institution from 1914 until his death.

Railway Clearing House

Mr. G. Morton, Chief Accountant of the L.M.S.R., was on March 27 unanimously re-elected Chairman of the Railway Statistics Committee, Railway Clearing House, for the year 1939.

Mr. G. Sutherland, Chief Accountant, L.N.E.R., has been appointed Chairman of the Accountants' Standing Committee, Railway Clearing House, for the ensuing year.

Mr. J. C. Bowyer, O.B.E., who recently retired after over 50 years' service with the Railway Clearing House, was on March 28 the recipient of a presentation from the accountants of the railway companies to mark their esteem for him and their appreciation of his ready help and co-operation during the many years he had been associated with railway accountancy.

We regret to record the death on February 26, at the age of 74, of Mr. Frederick William Leake, formerly Electrical Engineer of Tyer & Co. Ltd., the firm of electrical and signalling engineers. Mr. Leake's early electrical career was as Engineer and Manager of a power and light undertaking in South America, but he subsequently returned to England and became associated with the installation of electrical power and lighting on the former Great Eastern Railway. In association with the late Mr. Hollins and Mr. H. W. Firth, he became a leading figure in the Telegraph Department of that company. Mr. Leake remained with the G.E.R. until 1915, when he was appointed Electrical Engineer of Tyer & Co. Ltd. He retired in 1930.

Lt.-Colonel R. Tandy retired from the Electrical Engineer's Department, L.M.S.R., at the end of February. He was educated at Loretto School, Edinburgh, and served his apprenticeship with the British Thomson-Houston Co. Ltd., Rugby. Joining the former L.N.W.R. in 1909, he served under Lt.-Colonel F. A. Cortez-Leigh as an assistant in the Electrical Department. During the war he joined the R.E. Signals and served in France as Officer Commanding No. 2 Railway Telegraph Company. When the transportation units of the Supplementary Reserve were formed in 1925, he joined the Royal Signals and was attached to Transportation for Railway Telegraphs. In 1932 he took over command of No. 2 Company Lines of Communication Signals for Railways and was promoted to Lt.-Colonel in 1936.

We regret to record the death on March 21 of the Hon. Philip Henderson, Senior Partner in the firm of Messrs. Livesey & Henderson, Consulting Engineers. Born in 1881, the fourth of the six sons of the first Lord Faringdon, he was educated at Eton. In 1899-1902 he received practical training under Mr. J. G. Robinson, M.Inst.C.E., the Chief Mechanical Engineer of the Great Central Railway. During 1902-3 he inspected rolling stock for that railway under Mr. Robinson, and in the next year he was Assistant Engineer on the preparation of surveys and plans for the Manchester—Hyde Junction widening works. In 1904 he went as an assistant in the office to the firm of Messrs. Livesey, Son & Henderson, for whom he went out to South America to be Chief Assistant Engineer on two important contracts. On his return to England he re-entered the office, and during the years 1908-11 he worked at designing railway engineering works. He became a partner in 1912. At the beginning of the war he went out to Egypt with the 2nd County of London Yeomanry, with which he remained until January, 1917. As an engineer he was seconded to the Tank Corps as Officer Commanding Workshops Company in France with the rank of Major. In 1918 he returned to England on being appointed Technical Controller of Tank Corps Training Centres at Bovington Camp, with the rank of Lieutenant-Colonel. A year later he returned to the firm of Messrs. Livesey & Henderson, for whom he frequently travelled abroad, and in 1936 he became Senior Partner, succeeding the late Sir Brodie Henderson.

Opportunities and Capabilities of Youth

The last meeting of the season on March 16 of the G.W.R. (London) Lecture and Debating Society was occupied by a debate for members under thirty years of age on the motion "That the opportunities afforded to youth are inadequate to its capabilities," proposed by Mr. K. H. Havart, Stationmaster's Office, Paddington, and Mr. D. A. Smith, Secretary's Office; and opposed by Mr. W. H. Roper, Newport Goods, and Mr. N. P. Ellis, Chief Goods Manager's Office. The debate was preceded by the annual general meeting, and after an announcement that Mr. H. Wheeler, Assistant to the General Manager, was not seeking re-election to the committee, a vote of thanks for his long and valuable services to the society was passed unanimously. Mr. R. F. Thurtle presided.

The proposers of the motion said that facts to be borne in mind in the consideration of this perennial dispute were in the first place that the age composition and reproduction rate of the population was resulting in an ever increasing monopoly of control by the middle and old aged; and secondly that in a world where the great combine was the typical industrial unit, regulations played an overwhelming part, regulations which acted as a brake on the new ideas of which youth was generally the carrier. The capabilities of youth were actually increasing through higher education and training, but it was still as difficult for the young man to escape from routine work. His elasticity of mind should more than outweigh lack of experience, in bearing responsibility.

The opposers argued that opportunities were not waiting to be picked up but they depended on the efforts of youth. The reason why they were found inadequate was because youth did not search for them closely enough. It was therefore true to say, on general grounds, that the capabilities of youth were a doubtful quantity and needed proof before the opportunities could be shown to be inadequate. The opportunities could be increased only by giving responsibility to inexperienced people and thus jeopardising everyone's opportunities. Because youth was such an unknown quantity, maturity should be, and was, preferred to it as the recipient of opportunities. The fact was that today youth had much greater facilities to prepare itself for opportunities, of which it did not take sufficient advantage.

On the house dividing, the motion was carried.

XUM

Mansion House Association on Transport

Address by Minister of Transport at annual luncheon

The annual business lunch and general meeting of the Mansion House Association on Transport were held at the Trocadero Restaurant, London, on March 28.

Sir Isidore Salmon, Chairman of the association's Parliamentary Committee, presided at the luncheon. In welcoming Dr. Leslie Burgin, the Minister of Transport, he spoke of the magnificent services that had been rendered to the country by the ministry since its formation, and paid a tribute to the versatility, enthusiasm, and ability of the present Minister.

Mr. W. H. Gaunt, President of the association, referring to the railway companies' "square deal" campaign, said the companies had been well advised in publishing a revised statement of their intended relations with other forms of transport, as this had facilitated an agreement that otherwise would have taken much longer to obtain. The association did not agree that the subjects for revision proposed by the railways comprised the whole programme requiring attention, and considered that were their requests granted they would achieve only a partial return to their former traffic volume. Long-distance medium class traffic, which the railways justly claimed to handle efficiently, had been reduced in volume during the past decade by rationalisation of industry and short-distance distribution methods. This question was the subject of recommendations in the association's memorial to the Transport Advisory Council. It was hoped that when Parliament acted, it would do better than had been done in implementing the Salter Report. Mr. Gaunt hoped the Minister would be able to give good news regarding the reconstruction of weak bridges, of which 2,000 had been scheduled for rebuilding (1,256 of them for complete reconstruction) in 1936.

Tribute to Organisation

Dr. Leslie Burgin, the Minister of Transport, said he wished to pay a tribute to management and careful organisation. Too much nonsense was talked about the staff officer with a brass hat as if he was necessarily a congenital idiot. Far too little was said of those quiet people of real efficiency who planned in advance, and with knowledge. For two or three hours that morning, the Minister continued, he had enjoyed the extreme pleasure of travelling on the footplate of L.M.S.R. locomotives, and Mr. Gaunt would be pleased to know that at one point they had reduced speed to 15 m.p.h. on account of bridge reconstruction.

Success in military, naval or air force operations depended on the maintenance of communications. Should war ever confront this country, whether in the form of attack upon us or as counter-attack as a measure of defence, there would be a greater strain than ever before upon the main problem of all successful operations—namely, the maintenance of communications. With regard to the political outlook, Dr. Burgin said he believed the forces of ruin which threatened the world were great, but that very greatness had the power to raise up forces in answer at least as great, so that equilibrium and peace should be maintained if sanity prevailed. He thanked all who had taken part in the preparation of schemes to confront emergency.

Weak Bridges

Dealing with the question of weak bridges, the Minister said that of 1,155 bridges on non-trunk roads, 395 were in hand and of them 92 had been completely rebuilt. On trunk roads there were 100 bridges to be dealt with, of which 64 were in hand, or the subject of plans or negotiations. One of the difficulties arose from the negotiations necessary over railway bridges. A railway bridge, carrying a statutory undertaking with the obligation to provide a service, was not the easiest thing to take down overnight and multiply by four for road purposes. A committee had been called together to seek a standard form of agreement which would apply to every case.

Sir Arthur Griffith-Boscawen, Chairman of the Transport Advisory Council, said that the committee of the council had finished its "square deal" report, and had reached agreement on nearly every subject of importance. It would not do to agree on everything as they had to leave something for the Minister to do. He hoped a result of their inquiry would be to bring about a much greater degree of co-ordination between various kinds of transport than had existed up to today.

Sir Ralph Wedgwood described the committee's report as a great tribute to the qualities of the Chairman, and to the qualities of compromise and understanding characteristic of the British when representatives of different interests came to sit round the same table. He was glad to say he was still allowed to take part in the discussions on the "square deal," and hoped to see them to a satisfactory conclusion. There was need for mutual understanding in the transport world in the face of a great emergency. The business of all transport agencies at the present time was to see that the maintenance of communications in this country was kept at its maximum efficiency.

In an address preceding the formal business of the general meeting, which followed the lunch, Sir Isidore Salmon said that what the transport industry objected to was not a reasonable amount of regulation, but prohibition.

Mr. W. H. Gaunt criticised the attitude of the licensing courts towards the clause of "alternative facilities" in the law they had to administer, and said traders wanted more emphasis to be given to the factor of *suitable* alternative facilities.

Captain Austin Hudson, Parliamentary Secretary to the Ministry of Transport, described lack of organisation as still the greatest weakness of the road transport industry, but a Bill was before Parliament that should regularise the position of "C" licence holders. He drew attention to the fact that the report of the "square deal" committee of the Transport Advisory Council had been unanimous, and unanimity between road and railway was not an everyday occurrence.

L.M.S.R. Quota Awards

On Wednesday afternoon last, Lord Stamp, Chairman and President of the Executive, L.M.S.R., presented the cups and shields to the winners for 1938 in the Quota League competition, a competition now five years old. Mr. T. E. Argile, Acting Chief Commercial Manager, presided at the presentation, which was held in the Shareholders' Room, Euston station. Those who supported him included :—

Messrs. A. E. Pullar, C. Ker, Sir William V. Wood, Messrs. H. V. Mosley, O. Glynne Roberts, T. W. Royle, C. E. Fairburn, S. J. Symes, A. F. Bound, L. F. Rowlandson, W. P. Bradbury.

The inter-district championship cups were presented to the managers of the following districts : Passenger League, London ; Goods League, Chester ; Coal League, Barrow ; Port League, Fleetwood ; after which the winners of local district leagues received their challenge shields.

Mr. Argile opened the proceedings, and said he appreciated the presence there of Lord Stamp and the directors and officers of the company. He saw in the welcome return after illness of Mr. Ashton Davies—a great worker in the cause of Quota—an augury of good for the league. Mr. Argile then called upon Lord Stamp to address the assembly.

Lord Stamp said that 1938 had been a bad year, but that only meant that more credit was due to the winners. While Quota remained a stimulus it was to be valued. Lord Stamp's concluding remarks were on the subject of the "square deal" campaign, about the success of which he was highly optimistic.

After the winners of the four cups had made short speeches, Mr. Ashton Davies made a speech in which he stressed the contact value of the spoken word.

XUM

Railway Benevolent Institution Dinner

The 81st anniversary dinner of the Railway Benevolent Institution was held at the Connaught Rooms, London, on Thursday, March 23, under the presidency of the Rt. Hon. Leslie Burgin, Minister of Transport. The following donations and subscriptions were announced :—

	£
His Majesty the King (annual subscription)	100
Other contributions	1,467
Total of President's list ..	£1,567
Collected and contributed by the chief officers and staff of the following companies :—	
Great Southern Railways Company : Mr. P. J. Floyd ..	2,804
London Midland & Scottish Railway Company : Lord Stamp..	2,651
London & North Eastern Railway Company : Mr. C. H. Newton	2,325
Great Western Railway Company : Sir James Milne ..	1,724
Southern Railway Company : Mr. Gilbert S. Szlumper ..	886
Great Northern Railway (1) Company : Mr. G. B. Howden	210
London Passenger Transport Board : Mr. H. S. Chapman	193
Cheshire Lines Committee : Mr. G. Leedam	180
Westinghouse Brake & Signal Co. Ltd. : Mr. J. Griffith Hall	156
Railway Signal Co. Ltd. : Mr. W. S. Roberts	24
Other collections	155
Total	£12,875

Among those present were : Lord Balfour of Burleigh, The Hon. A. W. Baldwin, Messrs. H. Barnden, F. Stanton Barnes, T. Barty, Capt. Guy V. Baxendale, Messrs. A. G. Beach, W. Gordon Bradley, Sir Harry E. Brittain, Messrs. J. Calder, F. L. Castle, O. H. Corble, Sir George L. Courthope, Messrs. C. H. Cowtan, E. C. Cox, F. S. Darby, R. G. Davidson, F. R. E. Davis, W. J. Devenish, J. Doyle, A. Edge, G. Ellson, A. Endicott, W. S. Every.

Messrs. P. J. Floyd, E. Fookes, Sidney E. Garcke, J. Fredk. Gee, L. C. Glenister, Eric Gore-Browne, R. S. Griffiths, Sir Harold Hartley, Messrs. C. A. F. Hastilow, A. C. Spencer Hess, R. Holland-Martin, Lord Horne, Mr. G. B. Howden, Sir Henry Mather Jackson, Messrs. W. H. Johnson, A. E. Kirkus, A. J. D. Kitson, F. L. Klamborowski, D. R. Lamb, L. J. Le Clair, Charles E. Lee, R. J. R. Loxdale H. V. Loxdale, E. F. Marsh, Sir Ronald Matthews, Messrs. A. L. McColl, P. H. McCormack, John C. Mitchell, Major Montgomery, Messrs. K. Leslie Mortimore, George Morton, J. R. Morton, A. Moss, Lt.-Colonel A. H. L. Mount.

Messrs. L. H. K. Neil, C. H. Newton, C. H. Nicholson, J. H. Nicholson, Sir Walter Nugent, Messrs. F. J. Orchin, E. E. Painter, W. G. Pape, A. G. Pollard, V. Radford, R. M. T. Richards, V. A. M. Robertson, A. T. B. Robinson, M. D. Robinson, T. H. Rowe, Charles Sheath, F. H. Hartnell Smith, Lord Stamp, Messrs. J. E. T. Stanbra, W. A. Stanier, W. Stott, C. H. Sutherland, Gilbert S. Szlumper, H. Thompson, R. F. Thurtle, F. L. Timmins, F. W. Tipton, Sir George Wyatt Truscott, Sir Harry S. Vanderpant, Messrs. John F. B. Vidal, R. B. Walker, H. C. Walton, Major H. A. Watson, Messrs. W. C. Wayland-Carr, H. B. Webster, H. E. O. Wheeler, H. C. Wintle, A. Woods, Alec Young.

Sir Harry Brittain, in proposing the toast of "Success to the Railway Benevolent Institution," said he was able perhaps to appreciate British railways even more than some of his fellow countrymen, for it had fallen to his lot to have travelled on the railways of all five continents and in a very large number of countries. From whatever part of the world one might return it was always a joy and a delight to get on an English train again. Not only did one notice at once the excellence of the permanent way and enjoy the comfort of first rate rolling stock, but one could not help appreciating the splendid personnel connected with every branch of our railway service. Speaking of "road and rail," Sir Harry Brittain said that the railways had fought grimly a long uphill struggle. Looked at from the national point of view one could not help feeling how vital were the railways in the days of difficulty, and how essential it was to keep them up to date. The roads too were vital, but it was a mistake to overload them. As an owner driver since the early days of cars, he was impressed by the fact that nowadays one constantly met "vast Juggernauts on Heaven knows how many wheels" when motoring on English roads. They were fearsome to pass and still more fearsome to overtake, particularly when three or four careered along in line. "I cannot help thinking," he added, "as doubtless has many another driver, that surely it would make for a happier world if some of these vast elephantine machines could be persuaded to leave the road for the rail."

Dr. Burgin, in responding, spoke of the generous response to claims on human sympathy, and announced that no less than £12,875 had been collected for the institution during the past year. Through the Casualty Fund 105 persons a week were assisted, or about 18 every working day. The springs of benevolence were always listened to, they never ran dry, and the British public, when told of need, magnificently responded and gave to a cause which it took to its heart. Particularly he called attention to the magnificent sum contributed to the Railway Benevolent Institution by the Great Southern Railways Company of Ireland.

Lord Balfour of Burleigh, a Director of the L.N.E.R., proposed "The Health of the President." Dinner was followed by dancing.

STAFF AND LABOUR MATTERS

Railway Wages: Decision of Railway Staff National Tribunal

The executive of the Railway Clerks' Association, meeting in London on Sunday, March 26, recorded its "strong disappointment" with the recent award of the Railway Staff National Tribunal on claims for increased pay and improved working conditions. The whole question was remitted to the annual conference of the association, which opens at Bournemouth on May 15. This is the first decision on the award taken by any of the three railway unions. The Railway Clerks' Association in making no specific decision has left the position open in case there is a joint meeting with the two other unions—the National Union of Railwaymen and the Associated Society of Locomotive Engineers and Firemen—to agree to a common policy. The National Union of Railwaymen has called a special delegate conference in London for April 3 to consider the award, and the associated Society is holding a delegate conference in London on April 4.

Reduction of Hours of Work in Rail Transport

The preparatory Technical Tripartite conference on rail transport completed its work on Friday, March 24, at the International Labour Office, where it has been in session since March 20. In closing the meeting the chairman, Señor Helio Lobo, the Brazilian Government delegate, said that the conference could not consider the reduction of hours of work in the railway industry on account of the present circumstances, the gravity of which was apparent. While the reduction of hours had been tried in certain large industrial countries with advanced legislation, the question had perhaps not yet reached the degree of maturity essential for any international action on a large scale. A report was unanimously adopted which will be submitted to the I.L.O. governing body. It contains the views expressed by the delegates on all the technical problems connected with international regulation of hours of work in the normal working day or week.

Inquiry into Holidays with Pay

A committee has been set up by the Industrial Welfare Society, with the approval of the Minister of Labour, Mr. Ernest Brown, to investigate problems created by the increase in the number of workers receiving holidays with pay. Lord Amulree, who was the chairman of the Government committee on holidays with pay, which reported in 1938, is the chairman of the new committee. The members include representatives of the railways, road transport, health resorts, hotel and apartment keepers, travel agencies, National Savings Committee, employers' and workers' organisations and various voluntary social service bodies.

FIRST JUGOSLAV-BUILT LOCOMOTIVES.—The first locomotives to be built in Jugoslavia have now been completed at Slavonski Brod, in Croatia. The ten locomotives concerned have successfully passed their tests, and will shortly be taken over by the State Railways, states a Reuters message from Belgrade.

XUM

RAILWAY LAW FOR THE QUARTER

Railways as Trust Investments

The decision of the Great Western Railway Company to pay only ½ per cent. as dividend on the ordinary stock has aroused apprehension in the minds of trustees as to the position of the prior stocks as trust investments. Hitherto these have been full trust investments authorised by the Trustee Act, 1925, sec. 1 (g), which includes English railway debentures, guaranteed or preference stock, provided that 3 per cent. has been paid on the company's ordinary stock for the last ten years. None of the home railways is at present fulfilling this conditions. Existing investments are however not affected, because it is no breach of trust for trustees to continue to hold investments which have ceased to be trust investments (Trustee Act, 1925, sec. 4). In making fresh investments trustees are still able to consider prior English railway stocks because by the Trustee Act, 1925, sec. 1 (r) those stocks are eligible which are authorised for investment of cash under the control or subject to the order of the Court.

By Order XXII, rule 17, of the Rules of Court, prior stocks of English railway companies are made eligible for the investment of funds in Court, provided that for the last ten years *any* dividend has been paid on the ordinary stock of the company. The Great Western Railway Company's dividend of ½ per cent. is thus sufficient to satisfy this statutory condition. The objection is that the Rule of Court in question might be altered at any moment, and the investments might fall in value in consequence, but such an alteration is not likely and moreover trustees would be protected as regards their existing investments under sec. 4, as already explained. It is to be observed that the prior stocks of other companies did not fall appreciably in direct consequence of their failure to pay any dividend on the ordinary stock, and it is right to suppose that these railway prior stocks will always afford a fair field for investment of some part of trust funds.

Common Employment and Common Work

Radcliffe v. *Ribble Motor Services Limited.* "*The Times*" *of February* 24.

In June, 1936, Eric Radcliffe, a motorbus driver in the defendant's employment was killed in Liverpool by being crushed between his bus and that driven by another driver in the same employment. Radcliffe had alighted from his bus and the other driver was driving past him to see what, if anything, were wrong and to see if he wanted help. Radcliffe's widow brought an action against the bus company for damages and Mr. Justice Hawke awarded her £1,579. The company appealed, relying upon the old doctrine that where the injury to a servant is done by another in the same employment the master is not liable for the consequences of the injury. The Court of Appeal reversed Mr. Justice Hawke's decision and held that this doctrine of common employment prevented the widow from recovering. The case then went to the House of Lords which has restored the judgment of Mr. Justice Hawke and found for the widow. Lord Atkin has given an interesting judgment showing how the old doctrine must be limited in the light of recent decisions.

It was in *Hutchinson* v. *York Newcastle & Berwick Railway Company* (5 Ex. 354) that the doctrine was developed, and was shown to rest on the implied contract made by a servant when he entered into the company's service that he was willing to take the risk of negligence on the part of any of his fellow servants and that he would not hold the master liable for injuries caused through want of skill of the other, where the two were jointly engaged in a common service. That was followed in *Bartonshill Coal Company* v. *Reid* (3 Macq. 266), in which a miner's widow was held unable to recover for the loss of her husband who was killed owing to the negligence of the man in charge of the cage coming down the mine shaft.

In Radcliffe's case Lord Atkin discusses these cases and points out that the whole question turns on what is meant by "common work" or "common service." The two drivers here were proceeding independently through the streets of Liverpool although they were making for the same destination. They might meet in the same garage and there they might be dependent on the skill with which the other drove. But where they were driving through the streets of Liverpool each was no more interested in the skill of the other than in that of the thousands of other drivers who were at work on the streets. It is upon this basis that the doctrine of "common employment" must be construed today in cases arising out of personal injuries to fellow servants.

Statute has of course made inroads on the doctrine of common employment. Thus, although it does not abolish the doctrine, the Employers Liability Act, 1880, modified it considerably. Before the Act, the workman or his dependents could recover only where the employer had neglected some statutory duty or had been personally negligent. After the Act he could recover where the employer had delegated his duties of superintendence to others, and those others had been negligent in carrying out their duties. So far as railway companies are concerned, the company is responsible for the negligence of any person in its service who has charge of a train, signal, points, or locomotive—see the Employers Liability Act, 1880, sec. 1 (5). Railway servants are thus in a stronger position in this respect than other workmen. The Workmen's Compensation Acts, again, to the limited extent of the amount of compensation under the Act, give the workman compensation against the employer for all injuries suffered as the result of accident in the course of his employment quite apart from any question of negligence.

International Carriage by Air

Philippson v. *Imperial Airways Limited,*" "*The Times*" *of March* 3.

On the night of March 5, 1935, a box containing gold coin to the value of £10,600 was stolen from the Croydon airport. It was the property of the plantiffs, a Belgian firm, and had been delivered to the Imperial Airways Limited, for carriage to Brussels. The contract was contained in the consignment note, and the exceptions clause provided that any action must be brought within two years, but in the case of "international carriage" within six months. The distinctions between "internal" and "international" carriage were very complicated. Mr. Justice Porter held that the carriage was "international," and therefore the plaintiffs were out of time in their action, and he was confirmed in this by the Court of Appeal. A further appeal to the House of Lords produced a reversal of this view by a majority of three Judges to two, so the final judgment is in favour of the plaintiffs, who recover their £10,600. It is somewhat ironical that while six learned judges in all have declared for the defendants and only three against them, they have lost their case. But when one considers the intricacies of the Carriage By Air Act, 1932, the conditions of carriage by air under the Convention of Warsaw, 1929, and the terms agreed for such carriage by the International Air Traffic Association, the divergence of views and the legal uncertainties are not surprising.

Infringement of Patent

General Railway Signal Co. Ltd. v. *Westinghouse Brake & Signal Co. Ltd.* (*see* THE RAILWAY GAZETTE *of February* 25 *last*).

There are really two classes of invention—those which consist in the discovery of a new principle, briefly called "master patents," and those which consist in a new method of applying a well-known principle. In considering whether there has been an infringement of the first class, the Court will regard with strictness any other method for carrying that principle into effect because it is not for the inventor to specify every method of applying his principle. Here a defendant will be deemed to have infringed if he has brought about the same result by methods substantially the same in principle as those of the inventor. The second class consists of those inventions in which only a new method of

applying an established principle is claimed, and in this case the defendant is only held to have infringed if he has used the particular method.

In the General Railway Signal Company's case, the claim was for infringement of a principle claimed by the inventors as their own. The learned Judge—Mr. Justice Morton—held that the rights claimed to have been infringed were too vague to be protected by the Court. The same rule applies in this respect whether the invention claimed is of the first or of the second class above mentioned. In either case as Mr. Justice Romer (afterwards Lord Justice Romer) said in *Nobel's Explosives Co.* v. *Anderson* (Reports of Patent Cases, vol. XI, p. 115), "In order to make out infringement it must be established, to the satisfaction of the Court that the alleged infringer, dealing with what he is doing as a matter of substance is taking the invention claimed by the patent: not the invention which the patentee might have claimed if he had been well advised or bolder, but that which he has in fact and substance claimed as a fair construction of the specification."

G.W.R. Units Royal Engineers Supplementary Reserve

The eleventh annual dinner of the three Great Western Railway Units of the Royal Engineers Transportation Branch, Supplementary Reserve, was held at the Chiltern Court Restaurant, London, on March 25. Major E. C. Cookson, Officer Commanding the 152nd Railway Construction Company, presided and was supported by Major L. L. Yorath, Officer Commanding the 154th Railway Operating Company, and Major R. H. Edwards, Officer Commanding the 151st Railway Construction Company. About 250 serving and past members of the units were present, as well as a number of visitors. The principal guest was Colonel Sir W. Charles Wright, a director of the G.W.R., and among those present were :—

Major A. Bond, Major C. E. A. Browning, Captain W. T. Calvert (Adjt. S.R. Tptn. Units), Colonel R. Carpmael, Mr. K. W. C. Grand, Colonel J. P. S. Greig (A.D.T., War Office), Major F. Holland, Captain V. R. Illingworth, Major R. C. Kirkpatrick, Mr. J. W. A. Kislingbury, Mr. J. F. Lean, Lt.-Colonel D. J. McMullen (Commandant, R.T.C., Longmoor), Major C. S. Napier (D.A.D.T., War Office, and first Adjutant, S.R. Tptn. Units), Major A. S. Quartermaine, Captain W. J. Scott, Major S. E. Tyrwhitt, Colonel W. G. Tyrrell, Lt.-Colonel R. D. Waghorn (Commandant, R.T.C., Longmoor elect.), Captain R. J. Walker (Adjutant, R.T.C.), Mr. A. Waple, Major H. S. B. Whitley, Captain W. A. Willox (Associate Editor, THE RAILWAY GAZETTE).

Major Cookson, proposing the toast of "The Great Western Railway," referred to the co-operation of the railway officers and the encouragement given by the management to those responsible for the units, the results of which were indicated in the high numerical strengths of the three companies.

Colonel Sir Charles Wright, in replying, said that the previous year had not only been a difficult, but a disastrous one for the G.W.R., as it had lost a reputation which it had held for over 60 years. As an old Militiaman, he congratulated the units and hoped that he would be able to visit them in camp this year.

Major Edwards, in proposing the toast of "The Guests," welcomed those who were present, and said that he and his brother officers were very proud of the support given to the dinners, and the interest taken by the railway officials, regular officers, and retired members of the units.

Colonel Carpmael, in replying, said that the guests all felt that they were welcome to the dinners and were made to feel that they were one of the "family."

Major Yorath, as proposer of the toast of "The Army," assured those present that if there was a "scrimmage," the S.R. would be in the "back row," and they would do their "shoving," and the nation would "get the ball."

Colonel Greig, replying, said that it was essential to show the world that we were ready, and so far as the railway units were concerned, this was so.

Lt.-Colonel McMullen, in proposing the toast of "The Transportation Units, R.E.," referred to it as his "good-bye" speech as Commandant, Longmoor. He congratulated the units on the maintenance of the high percentage of their establishments.

Captain Scott, in replying, said that the 151st, 152nd, and 154th Companies were fully conscious of the trust placed in them by the War Office, and that if the call came every man would do his utmost to prove that trust.

Exhibited on the top table were the numerous silver trophies belonging to the units. The results of the competitions for the principal ones for 1938 were as follows :—

"Milne Cup" for general efficiency, won by the 151st Coy.

"Bowler Cup" for rifle shooting, won by the 151st Coy.

"Lean Bowl" for selected sporting events, retained by the 152nd Coy.

The arrangements for the dinner were made by Major Cookson and a small committee, and a vote of thanks which was proposed by Captain Illingworth was received with applause.

QUESTIONS IN PARLIAMENT

Delivery of Air-Raid Shelters

Mr. Alan Herbert (Oxford University—Ind.), on March 23, asked the Lord Privy Seal whether he was aware that all deliveries of Government air-raid shelters so far had been by rail, notwithstanding that Wolverhampton and Walsall, from which shelters were being dispatched, were connected with London and other parts of the country by canal; and, as this was the cheapest form of transport, would he see that in future contracts provision would be made for delivery by canal.

Sir John Anderson (Lord Privy Seal): No single manufacturer is producing a complete shelter. The production of the various parts comprising a shelter has been arranged with about 90 firms, spread over the country. The task of collecting these component parts from the works and of synchronising the arrival of complete sets with the minimum delay in transit and without intermediate handling and storage at a number of points from which delivery can be made by short haul to householders is regarded as an operation not suited to the canal transport system and has been arranged with the railway companies.

Telephone Service at Railway Stations

Mr. Vernon Bartlett (Bridgwater—Ind.), on March 27, asked the Postmaster General whether he would consider the erection of public telephone boxes on the platforms of all important railway stations.

The Postmaster General (Major Tryon): A number of such telephone boxes has already been provided; but in some cases where a telephone box would be desirable, there is no suitable site available on the platform. I shall be glad to consider any specific case which the hon. member may have in mind.

The Square Deal Application

Mr. C. C. Poole (Lichfield—Lab.), on March 29, asked the Minister of Transport if he was yet in a position to state the result of the Transport Advisory Council's consideration of the railway companies' square deal application.

Dr. Leslie Burgin (Minister of Transport): I have not yet received the report of the Transport Advisory Council on this matter, but hope to before the Easter recess.

Mr. G. Ridley (Clay Cross—Lab.): Will the Minister make the report available to the House in advance of legislation, if any?

Dr. Burgin: I would like to consider that. I am hoping to receive the report before the Easter recess. I realise its importance. I imagine it will have to be published, but perhaps the hon. member will allow me to give a little thought to the point.

Mr. A. P. Herbert (Oxford University—Ind.): Will the Minister take into consideration the extent to which railways give a square deal to the canals?

There was no reply.

XUM

RAILWAY AND OTHER MEETINGS

Associated Electrical Industries Limited

The annual general meeting of Associated Electrical Industries Limited was held at Bush House, London, W.C.2, on March 30, Sir Felix J. C. Pole, Chairman of the company, presiding.

The Secretary (Mr. R. H. Haviland) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts said that this was their thirty-ninth meeting, but he recalled that the year 1938 was the tenth year of the company's existence as Associated Electrical Industries Limited. The group was formed with the object of effecting the close co-operation of their companies, in order to eliminate unnecessary duplication of effort and expenditure, and to secure economies generally in such matters as research, engineering and development, manufacturing processes, and the purchase of materials. In the decade now past, they had largely effected these objects, and had dealt with the many difficult problems incidental to their enlarged activities, as well as world trading difficulties, and he was glad to say they looked forward to their next decade with confidence. In 1929, their first Chairman, Mr. Levis, said that the output for the year 1928 constituted a record in the history of the company. The Chairman was glad to repeat this statement in relation to the year 1938.

In pursuance of their usual policy, they had again provided substantial depreciation, the figure being £229,934, an increase of £12,178. This referred to the assets of the Metropolitan-Vickers Electrical Co. Ltd. only. During the past three years that company alone put to depreciation of buildings and plant £597,264, or an average of about £200,000 per annum. In the year under review the two largest companies of the group, the British Thomson-Houston Co. Ltd., and the Metropolitan-Vickers Electrical Co. Ltd., together provided depreciation amounting to £456,875. As regards taxation, which accounted for the very large sum of £505,257, an increase of £124,498, or 32·7 per cent., the Chairman said that apart from the increase of income tax, they now had the full effect of the National Defence Contribution. Had there been available for dividends the aggregate sum paid by the companies of the group as National Defence Contribution, they could have increased their distribution by 3 per cent. Therefore, the stockholders not only bore higher income tax, but lost the whole of the increased dividend, which could have been paid but for the new National Defence Contribution. They all desired that this country should be rapidly equipped with a full measure of armaments, but they also hoped that the nations of the world would soon regain what he might term international sanity. He was satisfied that the people of all nations desired peace, goodwill, and international trade. Doubtless the strengthening of the armaments of this country and of those of all sections of the British Empire was the best means of ensuring peace. They did not grudge the amounts which they had to provide as taxation for this purpose.

The profit for the year, including dividends from subsidiary companies, which dividends in the aggregate were less than the profits earned, amounted to £1,399,499. This was the largest profit earned in the history of the company and was £109,491 greater than in the previous year. The balance available, however, was slightly less than last year owing to the greatly increased taxation. The amount after deducting taxes and depreciation was £664,308, to which had to be added £220,015, the amount brought forward from the previous year, making the total profit available for distribution £884,323. From this there had been appropriated £100,000 to the special reserve account and £100,000 to dividend equalisation account. After providing for the dividend on preference stock, £75,843, there remained £608,480, and the directors recommended a dividend on the ordinary stock at the rate of 10 per cent. per annum, less tax, leaving a balance to be carried forward of £251,647.

The capital and general reserves, and profit and loss accounts as shown in the consolidated balance sheet had increased £336,765 to £3,125,503, which latter figure represented 63·5 per cent. on their ordinary capital. These reserves, shareholders would agree, placed their company in an exceptionally strong financial position. With regard to reserves, the allocation of £100,000 to special reserve was in connection with their pension arrangements. Each of their subsidiary companies had its own pension scheme, but these schemes did not provide adequately for the senior members of the staff. They had now established an A.E.I. pension fund to which this company, their subsidiary companies, and members of the staff who would receive benefits under it, were contributing. Their company had certain overriding responsibilities in connection with the pension scheme and might also have to deal with certain exceptional cases, and for that reason they had thought it well to raise the special reserve to £200,000, which, they believed, would fully cover any possible future liability. They had also allocated an additional £100,000 to dividend equalisation account, increasing this account to £200,000. The directors desired to keep dividends on as even a basis as possible, believing that policy to be in the interest of maintaining a stable body of stockholders.

The inflow of orders during 1938 was greater than in any previous year, except the year 1937, which was a record. This was in accordance with expectations, having regard to the abnormally large quantity of orders received in 1937. All the works of the group were fully employed, and the output was the highest in the history of the company. Special efforts were made to effect deliveries, and the unexecuted orders on hand at the end of the year were slightly less than at December 31, 1937.

They had placed their manufacturing, engineering, and research facilities at the disposal of the Government. A considerable amount of Government work was in process of manufacture and the factory at Trafford Park had been extended to cope with Air Ministry and War Office contracts. Sir Kingsley Wood made an announcement in the House of Commons on November 10 last with reference to the manufacture of aircraft by the Metropolitan-Vickers Electrical Co. Ltd. in technical collaboration with A. V. Roe & Co. Ltd. A factory for this purpose was nearing completion on land adjoining the Trafford Park works. Also, in co-operation with John Brown & Co. Ltd., a financial interest had been acquired in the Westland Aircraft Co. Ltd., of Yeovil.

At the beginning of the year 1938 there was little expectation of equalling the achievements of 1937. That year was regarded, quite justifiably, as an abnormal one, during which records were created in all directions of the company's business activities. It was, therefore, gratifying to be able to state that whilst orders received during 1938 were not quite up to the high level of the previous year, the value of shipments made last year exceeded even the satisfactory dimensions of those of 1937, and constituted a record.

The use of electricity in this country continued to increase. Last year the total amount of electricity generated by authorised undertakers was 24,376 million units, as compared with the revised figure of 22,902 million units for the year 1937, representing an increase of 1,474 million units, or 6·4 per cent. Naturally this growth demanded the manufacture of more generating and other equipment, for which they received a large volume of orders. The largest machine ordered was a 60,000-kW. turbo generator set, and a number of other orders were received for large turbo-generator sets, switchgear, impulse type circuit breakers, transformers for the power stations supplying current to the grid, and equipment for collieries, steel works, and other industrial undertakings; for Metadyne equipments for the London Passenger Transport Board, and many others.

Once again it afforded him pleasure to refer to the magnificent work of their officers, staff, and employees of all grades, not only of this company, but of its subsidiaries, and they thanked everybody from their Managing Director, Mr. Lusk, downward, for a year's hard, loyal, and most efficient service.

The report and accounts were unanimously adopted.

Railway Convalescent Homes Dinner

The annual dinner of the Railway Convalescent Homes was held on Wednesday last, March 29, in the Wharncliffe Rooms, Hotel Great Central. Lord Horne, Chairman of the G.W.R., presided and among the guests present were :—

The Hon. A. W. Baldwin, the Rt. Hon. Lord Portal, Sir William V. Wood, Messrs. H. Adams Clarke, H. Barnden, M. A. Cameron, R. Carpmael, A. D. Cook, K. J. Cook, F. R. E. Davis, Ernest E. Evans, R. S. Griffiths, W. H. Johnson, D. R. Lamb, Wm. E. C. Lazenby, Charles E. Lee, J. L. B. Lindsay, J. C. Little, R. F. Morkill, H. S. Owen, C. G. Page, F. H. D. Page, J. H. Potts, C. Rayner-Smith, M. D. Robinson, S. G. Rowe, F. P. Sealey, J. F. Sparke, William Stott, R. F. Thurtle, A. Webb, H. Wheeler.

Also present were :—

Mr. William Tyrrell, Vice President of the Railway Convalescent Homes, Mr. H. Haigh, Secretary, and the following members of the board of trustees : Messrs. J. Allan, R. W. J. Canham, F. G. Coltman, R. O. Griffiths, R. E. Lyon, F. T. Roach, J. E. Sharpe, W. F. Smith, F. W. Wheddon, J. Whyte.

Lord Portal, in proposing the toast of " The Railway Convalescent Homes," said that although the homes had been in actual operation for 38 years, the first patients having been admitted in 1901, it was 40 years since the movement was actually set on foot, as the first meeting was held in 1899. It was obvious that such a movement could never have been started without the help of some benefactor, and he appeared in the person of the late Mr. Passmore-Edwards, who gave land at Herne Bay and money with which to start building. The far-sightedness of the founders was shown by the fact that they resolved that benefit should be confined to members (who must be in railway service), but that the cost of becoming a member should be so low that the poorest could afford to join. It was fixed at a halfpenny a week with benefit of a fortnight after sickness or accident available three months after joining. These conditions had never since been altered, except to extend the benefits by including, for the same half-penny a week, benefit for the wife. This figure had been maintained and benefits increased in spite of the fact that the purchasing power of these halfpennies had changed considerably, and, speaking as a Director of an insurance company, he was satisfied that the homes provided amazingly good value for so small a premium.

The movement had so spread that, to-day, there were approximately 377,000 members. The eight homes, five for men and three for women, had a total of 528 beds for patients and cots for 20 babies. Last year 7,300 patients enjoyed benefit and the total since the homes opened was nearly 143,000. At the homes there was no distinction of grade—all were equal and the spirit of good fellowship which prevailed was an outstanding feature. The success of the homes was due also to the efficient propaganda work carried on by the committeemen, all of whom give their services voluntarily. He (Lord Portal) could speak with considerable knowledge of the railway service, for he was the third generation in a family of railwaymen. His grandfather was Chairman of the old L.S.W.R. and subsequently his father was Deputy Chairman of the same company.

Lord Horne, in responding, also spoke of the remarkable results achieved on so small a sum as a halfpenny a week. As a former Chancellor of the Exchequer, he naturally took a keen interest in the financial side of the organisation, and was glad to be able to say that the decline in income from staff experienced during the three or four years before 1934 had been recovered gradually, and the income from this source during the year 1938, at £42,390, was the largest in the history of the homes. The patients of the present time were also enjoying the benefit of the careful management of previous generations of trustees who built up investments from which source an annual income of nearly £3,000 was now derived, thus enabling the homes to give benefit on a scale which would be impossible if they had to rely only on the present income from members of the railway staffs. There were good grounds for claiming that the objects for which the homes were founded were being fully achieved, for hundreds of letters arrived from patients telling of the welcome they received on arrival, of the comfort they found, the attention of the matrons, the good food, the cleanliness, the efficiency with which all needs were attended to, and the good comradeship which prevailed. Lord Horne also spoke of the arrangements whereby male patients requiring special diet were catered for at Ascog, and mentioned that in the event of war, the Dawlish home would be taken over as a Government hospital.

In view of Lord Horne's recent attack of influenza, the toast of " Our President " was next honoured, and he then handed over the chair to Lord Portal.

Mr. F. G. Coltman, the G.W.R. representative on the board of trustees of the homes, proposed this toast and recalled that Lord Horne had been President in 1935, when he had opened the games wing at Dawlish. During his term of office there the contributions from G.W.R. staff had increased from £4,327 to £4,520, representing approximately 1,800 new memberships.

Lord Horne, in reply, paid tribute to the work of the Secretary, Mr. H. Haigh.

The toast of " Our Guests " was proposed by Mr. W. F. Smith, Chairman of the board of trustees, and Mr. William Stott replied.

London Passenger Fares

As we briefly recorded last week, the Railway Rates Tribunal has been considering, at Niblett Hall, Inner Temple, E.C., since March 20, the application of the four main-line companies and the London Passenger Transport Board for sanction to a 5 per cent. increase in certain fares within the London Passenger Transport Area. Objections to the application are being raised by the County Councils of London, Middlesex, and Hertfordshire, by 40 other local authorities, and 21 other bodies. As explained last week, the main-line companies are seeking power to increase their standard fares by 5 per cent., similar to the increase operating as from October 1, 1937, outside the area. Without reference to the tribunal they have power to increase their revenue from fares within the area which are at present below the standard. London Transport is applying in respect of certain railways owned jointly by it and the main-line companies and certain sections of the main lines within the London area over which its trains operate. The whole of the first day's and a large part of the second day's proceedings were taken up by the opening address of Sir Walter Monckton, K.C., for the applicants. In the afternoon of March 21, evidence was given by Mr. Frank Pick, Vice-Chairman of London Transport, on the pooling agreement between the main-line companies and the L.P.T.B., and the tribunal adjourned until Thursday, March 23.

Sir William V. Wood, Vice-President, L.M.S.R., giving evidence on March 23 in support of the application, said that the receipts of the railway companies were at a dangerously low level to permit them to meet their obligations. Further expenditure was desirable to improve conditions, and it was necessary to make an all-round increase in fares which should be applied without discrimination. If the application were granted, they would not have power to increase any workman's fare which was now below fivepence. His evidence was continued on March 24. The Tribunal then adjourned until Monday, March 27, when Sir William Wood was further cross-examined. In certain cases the increase would be more than 5 per cent., but in other cases it would be less. The railways were not over-capitalised ; certain lines were redundant, but he would not suggest closing them, because they served the community.

Mr. Frank Pick, recalled, said on March 28, that the West End was not the attraction it used to be for shopping and entertainment. This was a factor which reduced the volume of traffic. London Transport was substituting oil engines for petrol engines as fast as possible. Dealing with anomalies in fares, he said that the Northern tube was acutely congested because having a standard fare of 1d. a mile, it served practically the same district as the Metropolitan, on which the standard was 1½d. a mile. The Tribunal adjourned until March 30, but was unable to resume its sittings on that date owing to the indisposition of Mr. Bruce Thomas, the President.

XUM

NOTES AND NEWS

American Locomotive Performance.—According to a recent report from the U.S.A., a Baldwin-built 4-8-4 locomotive on the Atlantic Coast Line in December last hauled a 20-car passenger train weighing about 1,340 long tons over a five-mile stretch at a flying average of 84 m.p.h. This train was accelerated from rest to 70 m.p.h. in about 12½ min. over a generally level line.

Improvements to Cruden Bay Hotel.—The L.N.E.R. is effecting improvements to Cruden Bay Hotel on the coast of Aberdeenshire, well known to golfers. Extra bedrooms are being installed and the open well on the first floor is being covered with a decorative glazed screen which will add to the comfort of guests in the lounge and reduce noises reaching the bedrooms.

Dinner of the Institute of Transport, 1940 and 1941.—The council of the Institute of Transport announces that it has made provisional arrangements for the next institute dinner to be held at the Connaught Rooms, London, on Friday, March 1, 1940; and for the 1941 dinner to be held on Friday, March 21, 1941, in commemoration of the twenty-first anniversary of the inaugural meeting of the institute, which took place on March 22, 1920.

Milford Docks Company.—SirFelix J. C. Pole, presiding at the annual meeting of the Milford Docks Company, on March 17, said that in common with most other dock and railway companies the business of this company had declined in 1938. Receipts from dock dues, wharfage, &c., were £4,572 less—the total being £72,965, compared with £77,537 in 1937. This was due mainly to the fact that the fishing industry experienced another difficult year. Milford ranked fifth among the fishing ports of Great Britain. The tonnage of fish dispatched from Milford in 1938 was 44,118, as compared with 44,879 tons in 1937. From the national point of view, Milford had outstanding geographical advantages.

L.N.E.R. Musical Society's Concert.—On Tuesday last, March 28, the L.N.E.R. Musical Society held a Bohemian concert at the Hamilton Hall, Liverpool Street Hotel, E.C.2. The concert was the two hundred and seventh to be given by the society. Leslie Woodgate conducted the full symphony orchestra of the society and the London section of the male voice choir. Anne Wood (contralto), John Oliver (baritone), and Katherine Stock (solo pianoforte) were the guest artistes. The visitors included :—

Mr. William Whitelaw, late Chairman, L.N.E.R.; Messrs. O. H. Corble, Assistant to Chief General Manager; Geoffrey Drury; E. L. Hawkins, late Assistant Engineer (Maintenance); H. H. Mauldin, Divisional General Manager, Southern Area; L. H. K. Neil, Assistant Continental Traffic Manager; M. D. Robinson, District Locomotive Superintendent, Neasden; Sir Alexander Walker; Captain E. F. Warren, Police Superintendent; Mr. R. R. Pettit, Chief of Police.

Speed Record in Argentina.—It is reported that the streamlined air-conditioned express, El Cordobes, placed in service last year between Buenos Aires and Cordoba by the Central Argentine Railway, has set up a new South American long-distance speed record. Over a distance of 189½ miles between Rosario and Retiro, the train maintained an average speed of 66 m.p.h. The distance was covered in 2 hr. 52 min., as compared with a scheduled time of 3½ hr.

Institution of Railway Signal Engineers.—At a meeting in London on March 22, Mr. F. C. Bruce, member, read a paper entitled "Safety and Design of Signal Circuits." In the discussion the following spoke: Messrs. H. M. Proud, L. J. M. Knotts, R. Dell, F. Edwards, A. W. Woodbridge, and the President, Mr. James Boot. There will be a provincial meeting at the Exchange Hotel, Liverpool, at 6 p.m. on April 19, following a visit to Callender's cable works at Leigh, Lancashire; a paper on "Electric Lamps for Railway Signalling" will be read by Messrs. J. C. G. Vowler and P. J. Sturges.

London Transport Posters.—The youthful Victoria, with her coming crown poised prophetically above her head, is the basis of a new London Transport poster design by "Batty," advertising the fact that the Underground stations at Queen's Road or High Street, Kensington, are convenient approaches to Kensington Palace, where Queen Victoria's childhood was spent. Another poster by the same artist shows the Princes in the Tower, portrayed in the instant of observing the approach of their assassin, who does not appear in the poster but whose presence is felt in the apprehensive glances and defensive attitude of his intended victims. A lighter note characterises the poster "It's in the Zoo." A giant turtle is seen taking its ease on the sands of a rocky cove, apparently oblivious of a party of seamen just come ashore from a vessel seen in the middle distance. One bearded mariner is cautiously stalking the monster with a coil of rope, apparently with the idea of lassoing him and taking him home as a prize to Regent's Park.

Northern Ireland Transport Board Finance.—Under the Road & Railway Transport Act (Northern Ireland), 1935, the Ministry of Finance has issued guarantees in respect of capital borrowings by the Northern Ireland Transport Board amounting at the present time to £2,750,000, of which about £2,600,000 has already been drawn. This money has been raised by bank overdraft, and as it is clearly impossible for the board to repay any part of these advances at an early date, the Ministry proposes to seek powers to enable the present and any future guaranteed bank borrowings to be liquidated by the issue of direct Government securities. The liability attaching to the board in respect of the guaranteed loan will, under the terms of the Act of 1935, continue to attach to the direct Government issue. As it is possible that Parliament may by later legislation empower the Ministry of Finance to issue further capital in respect of public transport in Northern Ireland, it is also proposed to provide borrowing powers for such an eventuality.

L.N.E.R. Refreshment Room Improvements.—The L.N.E.R. is to modernise the refreshment rooms at Peterborough and Doncaster stations. On the down platform at Peterborough the refreshment room walls will be panelled and a new counter and fittings provided. There will also be new central doors, improved lighting, and a new fireplace. On the up side the refreshment room walls are to be panelled and new counter fittings provided, together with new doors, fireplace, lighting, and other minor improvements. At Doncaster, the refreshment rooms on the up side will be altered to harmonise with the down side rooms, which are being considerably altered in connection with the reconstruction of the station. The walls of the refreshment room will be panelled and redecorated and new fireplaces provided; the lighting will be improved and an additional window fitted. Service lifts are to be brought up to date.

Aire & Calder Navigation Traffic and Works.—Presiding at the recent annual general assembly of the Undertakers of the Aire & Calder Navigation, Mr. J. M. Spencer Stanhope, the Chairman, said that the total tonnage of all kinds of traffic over the navigation in 1938 showed a decrease of 14¾ per cent. compared with 1937, but in 1937 there had been an increase of 14¼ per cent. over 1936. Regarding competition, it had been the aim of the navigation not to antagonise any form of transport. During the last half-century cordial relations had been maintained with the railway companies, and he did not think either the railways or the navigation had lost anything by this policy. The year 1938 saw the completion of a major capital work at Goole Docks—the Ocean Lock—situated at the south-east corner of the port. The lock was officially opened by Lord Stamp on May 7, 1938. Its opening had greatly facilitated the arrival and departure of vessels at the port.

L.M.S.R. Northampton Goods Station Improvement.—A scheme of alterations costing about £25,000 is to be carried out by the L.M.S.R. to improve the terminal handling of goods traffic at Castle goods station, Northampton. The goods shed is to be extended at the south end by about 45 ft., so as to accommodate additional rail wagons and to provide improved cart berthing facilities. Inside the shed, two electrically-operated conveyors will be installed to take inwards traffic to the sorting points. Consignments will then be distributed by deck trolleys, of

the type described in our article, "Modernising Goods Depots on the L.M.S.R.," in our March 5, 1937, issue. On the outside of the goods shed on each side, new covered decks of an average length of about 100 ft., will be provided for the storage of "wait order" traffic; other features of the scheme include installation of five electric capstans, six new electric cranes on the shed, and one replacement electric Goliath crane of 7½ tons capacity in the yard; also a new electric hoist, permanent way alterations in the goods yard, and additional and improved lighting in both shed and yard.

L.N.E.R. Ambulance Competitions.—The finals in the thirty-eighth annual ambulance competition of the Great Northern Section, L.N.E.R., were held at Liverpool Street station on March 21. Six teams took part. The cup was won by King's Cross Loco. with 346½ points; Boston, with 301 points, was the runner-up. The winner will represent the Great Northern Section at the group finals on May 3. Sir Ronald Matthews, chairman of the L.N.E.R., and President of the Ambulance Centre, presented the cup and prizes. Other officers of the company who attended included:—

Mr. C. H. Newton, Chief General Manager; Mr. H. H. Mauldin, Divisional General Manager, Southern Area; Mr. V. M. Barrington-Ward, Superintendent (Western Section); Mr. F. Warriner, District Superintendent, King's Cross; Messrs. J. F. Sparke and D. C. Fletcher, District Locomotive Superintendents; Mr. F. J. Trotter, District Superintendent, Doncaster; Mr. O. H. Corble, Assistant to the Chief General Manager; and Mr. R. R. Pettit, Chief of Police.

In a short speech, Sir Ronald Matthews expressed his pleasure at making the presentations, and said that the value of ambulance training was greater than ever in these troubled times.

Sir Gerald Talbot, K.C.V.O., C.M.G., distributed the prizes on the occasion of the finals in the Great Eastern Section ambulance competition, held at the L.N.E.R. (G.E.) Mechanics' Institute at Stratford on March 29. Bishopsgate "B" were the winners.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 12th Week			Totals to Date		
	1939	1938	Inc. or Dec.	1939	1938	Inc. or Dec.
L.M.S.R. (6,831¼ mls.)	£	£	£	£	£	£
Passenger-train traffic...	410,000	421,000	– 11,000	4,621,000	4,725,000	– 104,000
Merchandise, &c. ...	479,000	491,000	– 12,000	5,261,000	5,838,000	– 577,000
Coal and coke ...	288,000	253,000	+ 35,000	3,619,000	3,644,000	– 25,000
Goods-train traffic ...	767,000	744,000	+ 23,000	8,880,000	9,482,000	– 602,000
Total receipts	1,177,000	1,165,000	+ 12,000	13,501,000	14,207,000	– 706,000
L.N.E.R. (6,320 mls.)						
Passenger-train traffic...	263,000	267,000	– 4,000	3,070,000	3,124,000	– 54,000
Merchandise, &c. ...	325,000	364,000	– 39,000	3,647,000	4,149,000	– 502,000
Coal and coke ...	263,000	251,000	+ 12,000	3,181,000	3,333,000	– 152,000
Goods-train traffic ...	588,000	615,000	– 27,000	6,828,000	7,482,000	– 654,000
Total receipts	851,000	882,000	– 31,000	9,898,000	10,606,000	– 708,000
G.W.R. (3,737¾ mls.)						
Passenger-train traffic...	164,000	167,000	– 3,000	1,950,000	1,971,000	– 21,000
Merchandise, &c. ...	197,000	200,000	– 3,000	2,239,000	2,387,000	– 148,000
Coal and coke ...	117,000	112,000	+ 5,000	1,398,000	1,519,000	– 121,000
Goods-train traffic ...	314,000	312,000	+ 2,000	3,637,000	3,906,000	– 269,000
Total receipts	478,000	479,000	– 1,000	5,587,000	5,877,000	– 290,000
S.R. (2,140 mls.)						
Passenger-train traffic...	260,000	265,000	– 5,000	3,117,000	3,138,000	– 21,000
Merchandise, &c. ...	61,000	66,000	– 5,000	674,000	724,500	– 50,500
Coal and coke ...	34,000	33,000	+ 1,000	438,000	451,500	– 13,500
Goods-train traffic ...	95,000	99,000	– 4,000	1,112,000	1,176,000	– 64,000
Total receipts	355,000	364,000	– 9,000	4,229,000	4,314,000	– 85,000
Liverpool Overhead ... (6½ mls.)	1,261	1,237	+ 24	15,749	16,042	– 293
Mersey (4½ mls.) ...	4,609	4,567	+ 42	53,629	52,549	+ 1,080
*London Passenger Transport Board ...	562,300	569,900	– 7,600	22,087,800	21,896,800	+ 191,000
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,682	1,692	– 10	19,917	19,920	– 3
,, ,, goods	452	436	+ 16	5,184	5,222	– 38
,, ,, total	2,134	2,128	+ 6	25,101	25,142	– 41
Great Northern pass. (543 mls.)	7,100	7,250	– 150	98,450	96,300	+ 2,150
,, ,, goods	11,050	9,850	+ 1,200	115,750	104,150	+ 11,600
,, ,, total	18,150	17,100	+ 1,050	214,200	200,450	+ 13,750
Great Southern pass. (2,076 mls.)	27,181	27,223	– 42	332,389	335,178	– 2,789
,, ,, goods	43,058	40,212	+ 2,846	484,937	488,609	– 3,672
,, ,, total	70,239	67,435	+ 2,804	817,326	823,787	– 6,461

* 39th week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1938	Lowest 1938	Prices Mar. 29, 1939	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	65¼	25¾	26	+½
5% Con. Prefce....	118¾	74	79	–1
5% Red.Pref.(1950)	111¾	90	90	—
4% Deb.	111	97½	96	—
4½% Deb.... ...	112 5/16	100½	98	—
4½% Deb.... ...	118½	104	106	—
5% Deb.	131½	119	115½	—
2½% Deb.... ...	69¾	60	61½	—
5% Rt. Charge ...	129	114	107½	—
5% Cons. Guar. ...	128½	103	101	—
L.M.S.R.				
Ord.	30½	11	13	+¾
4% Prefce. (1923)	70¼	23	30½	—
4% Prefce. ...	82¼	43¾	47½	–2
5% Red.Pref.(1955)	103½	66	72½	–1
4% Deb.	105 15/16	85	89	–1
5% Red.Deb.(1952)	114¼	105	107½	—
4% Guar. ...	102¾	77½	79	–1
L.N.E.R.				
5% Pref. Ord. ...	8 9/16	3½	4	—
Def. Ord.	4 7/16	2 1/16	2⅛	—
4% First Prefce.	68¼	21	26½	—
4% Second Prefce.	27¼	8	10½	—
5% Red.Pref.(1955)	97	40¼	47½	—
4% First Guar. ...	97½	66¼	68	—
4% Second Guar.	91¼	52	54½	–2
3% Deb.	79¼	60	63	–1
4% Deb.	104⅛	77	84	—
5% Red.Deb.(1947)	110⅝	97	102½*	—
4½% Sinking Fund Red. Deb.	108 11/16	101	100	—
SOUTHERN				
Pref. Ord. ...	87	47⅞	62½	–½
Def. Ord. ...	21¾	9¼	13½	–½
5% Pref.	115	83	90½	–1
5% Red.Pref.(1964)	115½	98	95½	—
5% Guar. Prefce.	128½	106	106	–1
5% Red.Guar.Pref. (1957)	116	109½	108	–1
4% Deb.	109¼	95	93½	–1½
5% Deb.	129	117	113½	—
4% Red. Deb. 1962–67	107	101½	101½	—
BELFAST & C.D.				
Ord.	4	3½	4	—
FORTH BRIDGE				
4% Deb.	102	99⅛	96½	—
4% Guar. ...	103¼	94½	94	—
G. NORTHERN (IRELAND)				
Ord.	5½	2½	3½	—
G. SOUTHERN (IRELAND)				
Ord.	25½	8½	10	—
Prefce.	35	13	12¼	—
Guar.	70¼	30 13/32	30½	—
Deb.	83	56	51½	—
L.P.T.B.				
4½% "A" ...	119⅝	107½	110	—
5% "A" ...	130	117	117½	—
4½% "T.F.A." ...	108	98	103½	—
5% "B" ...	122 13/16	105	110	—
"C"	84	68	70½	–2
MERSEY				
Ord.	24¼	16½	21	–1
4% Perp. Deb. ...	102⅞	94¾	94½	—
3% Perp. Deb. ..	77	69	66½	—
3% Perp. Prefce.	66½	57	55	—

* ex dividend

XUM

CONTRACTS AND TENDERS

W. & C. French has received a contract from the L.N.E.R. for the demolition of certain buildings at Stratford station, the extension of the subways from the new underground booking office, and construction of new platforms for the tube lines. This work is part of the scheme for the electrification of the L.N.E.R. line from Liverpool Street and Fenchurch Street to Shenfield, and the extension of the Central London tube.

Big Contracts Placed by C.N.R.

The Canadian National Railways Administration announces that contracts have been placed for the manufacture of additional freight equipment, with a value of about $7,000,000. The National Steel Car Company has been given a contract for 725 box cars valued at about $2,366,250; the Canadian Car & Foundry Company, a contract for 650 box cars valued at $2,112,500, and 15 mail, express, and baggage cars to cost about $450,000; and the Eastern Car Company, a contract for 625 box cars, valued at $2,031,250. All cars will be of 40-ton capacity and of steel sheet construction, says the *Financial Post*, quoted by Reuters Trade Service.

The Bengal–North Western Railway Administration has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton :—

English Steel Corporation Limited : 1,120 laminated springs.
Willford & Co. Ltd. : 3,000 volute springs.
Thos. Firth & John Brown Limited : 160 steel axles for carriages and wagons.
J. Baker & Bessemer Limited : 67 steel axles for locomotives.

The Chinese Ministry of Communications, through the Chinese Government Purchasing Commission, has placed orders, to the inspection of Messrs. Fox & Mayo, with the Consolidated Pneumatic Tool Co. Ltd. for pneumatic rock-cutting and drilling equipment, and with R. Hudson Limited for baby track and switches and steel tip wagons, required for the Szechuen–Yunnan Railway.

The Chinese Ministry of Communications, through the Chinese Government Purchasing Commission, has also placed the following orders to the inspection of Messrs. Fox & Mayo :—

R. Johnson & Nephew Limited : Galvanised steel wire.
British Insulated Cables Limited : Copper covered steel wire and smoked hard-drawn copper wire.
Thos. Bolton & Sons Ltd. : Electrolytic copper rods and smoked hard-drawn copper wire.

The Swedish State Railways Administration has bought 146,500 tons of coal for delivery during the period April-September this year, learns Reuters Trade Service from Stockholm. The brands bought are exclusively British, *viz.*, Horden, Lambton, Hastings/West Hartley Main, South Hetton, Whitehaven, Maude, Wemyss, and Broomhill, and the prices vary from 21s. 3d. to 25s. 4½d. a ton.

Corpet, Louvet & Cie has received an order from the French National Railways for ten 2-10-2 tank locomotives. Intended for freight trains on the lines of the Grand Ceinture, these engines will be very similar to the 11 locomotives of Series 5.300 on the Région du Nord, but will have welded steel fireboxes.

Krupp India Trading Co. Ltd. has received orders from the Indian Stores Department for 50 bogie bolster springs and 2,000 volute drawsprings.

Stewarts and Lloyds Limited has received an order from the Central Argentine Railway for 1,500 acid-resisting galvanised solid drawn steel boiler tubes.

Leyland Motors Limited has received an order from Sheffield United Tours Limited for four single-deck passenger vehicles.

The Bengal-Nagpur Railway Administration has recently placed the following orders :—

C. C. Wakefield & Co. Ltd. : Cylinder oil.
Caltex (India) Limited : Superheat valve oil.
Silvertown Lubricants (India)Limited : Superheat cylinder oil, axle oil and mineral jelly.
Standard Vacuum Oil Company : Socony Davlight and Elephant oil.
Burmah-Shell Oil Storage & Distributing Co. Ltd. : Diesel oil.

R. Wright & Partners Limited has received an order from the Chief Controller of Stores, Indian Stores Department, New Delhi, for the supply of 7,500 volute drawsprings at a total price of Rs. 41,250.

Howell & Co. Ltd. has received an order from the Central Argentine Railway for 1,500 Howco zinced solid drawn Aquacidox steel boiler tubes.

The Crown Agents for the Colonies have recently placed the following orders :—

Siemens Bros. & Co. Ltd. : Magneto telephones.
P. & W. MacLellan Limited : Mild steel.
Whitehead Iron & Steel Co. Ltd. : Mild steel bars.
Vacuum Oil Co. Ltd. : Axle oil.
Associated Lead Mfrs. Export Co. Ltd. : Paint.
Torbay Paint Company : Paint.
Bayliss, Jones & Bayliss Limited : Permanent way bolts.
Turners Asbestos Cement Co. Ltd. : Piping.
Merryweather & Sons Limited : Pump.
Metropolitan-Vickers Electrical Export Co. Ltd. : Static transformers.
British Steel Piping Co. Ltd. : Steel piling.
Stewarts and Lloyds Limited : Steel pipes and specials.
Ericsson Telephones Limited : Telephone apparatus.
General Electric Co. Ltd. : Telephone apparatus.
V. & R. Blakemore : Tools.
Chloride Electrical Storage Co. Ltd. : Train-lighting cells.
Wm. Simons & Co. Ltd. : Twin-screw dredger.
H. McLean & Sons Ltd. : Twin-screw launch.
Firestone Tyre & Rubber Co. Ltd. : Tyres and covers.
G. Gilkes & Gordon Limited : Water turbo-alternators switchgear and cables.

The Birmingham Railway Carriage & Wagon Co. Ltd. has received an order from the Buenos Ayres Great Southern Railway for 400 drawhooks for cattle wagons.

Robert Stephenson & Hawthorns Limited has received an order from the Leopoldina Railway for two locomotive boilers.

The Bengal & North Western Railway Administration has placed orders to the inspection of Messrs. Rendel, Palmer & Tritton with Wm. Beardmore & Co. Ltd. for 50 pairs of carriage and wagon wheels and axles and with Alex. Ferguson & Co. Ltd. for 95 tons of red and white lead.

Thos. Firth & John Brown Limited has received orders to the inspection of Messrs. Rendel, Palmer & Tritton for 160 steel axles for carriages and wagons for the Bengal & North Western Railway and 54 steel axles for carriages and wagons for the Madras & South Mahratta Railway.

Ingersoll Rand Co. Ltd., has received an order from the Chinese Government Purchasing Commission, on behalf of the Chinese Ministry of Communications for rock-cutting equipment to be supplied to the inspection of Messrs. Fox & Mayo for the Hunan-Kwangsi Railway.

The Argentine Government announces that, in accordance with a barter arrangement with Germany, it is shipping 100,000 tons of wheat and 8,000 tons of wool in payment for railway material already ordered from the Reich.

Tenders are invited by the Controller of Stores, North Western Railway, Lahore, receivable by April 18, for the supply of 20 superheated boilers for SP/S 4-4-0 locomotives and eight for SG/C 0-6-0 conversion locomotives. Drawings are on view at Hodges Bennett & Co. Ltd., 16, Victoria Street, Westminster, S.W.1.

Tenders are invited by the Chief Controller of Stores, Indian Stores Department (Electrical Section), receivable by April 29, for the supply of 96,000 lead acid train-lighting cell separators.

The Lourenço Marques Port and Railway Administration is calling for tenders for the supply and delivery of quantities of switches, points, and crossings. Tenders should be addressed to 3a Seccao dos Armazens Gerars, Direccao dos Servicos dos Portos, Caminhos de Ferro e Transportes de Lourenço Marques, to be received by April 24. A copy of the schedule and general conditions of tender, together with drawings, may be borrowed from the Department of Overseas Trade, London, S.W.1.

The Victorian Railways Commissioners are calling for tenders (Contract No. 50843) for the supply and delivery of locomotive lubricators as follow : 20 mechanical lubricators, including accessories ; and 20 No. 0 Detroit type and capacity (one feed standard—one pint capacity, feed choked at the lubricator). Tenders must be received by the Victorian Railways Commissioners, Melbourne, by April 19. A copy of the specification and conditions of tender may be borrowed from the Department of Overseas Trade. Local representation is essential.

OFFICIAL NOTICES

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS

APPLICATIONS from qualified candidates are invited for the following post :—

TELEGRAPH ENGINEER

required by the Sierra Leone Government Railway for two tours each of 12-24 months with possible permanency. Salary £550 rising to £840 a year. Free passages, quarters and liberal leave on full salary. Candidates, aged 25-40, must be Associated Members of the Institution of Electrical Engineers, have received a thorough training in telegraph and telephone engineering, and subsequently have had practical experience with a British or Colonial Railway. A good working knowledge of Rural Automatic telephone exchange is essential and a working knowledge of Wireless Telephony and Broadcast Relay System would be an advantage.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/8294.

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THE DIRECTORY PUBLISHING CO. LTD., 33, Tothill Street, Westminster, S.W.1.

RAILWAY AND OTHER REPORTS

Sheffield & South Yorkshire Navigation Company—A net profit is reported for the year 1938 of £6,543, against £8,316 for 1937. The dividend on the 4½ per cent. non-cumulative preference shares for 1938 is to be 1 per cent., compared with 1¼ per cent. for 1937.

Trent Navigation Company.—Receipts on revenue account for the year 1938 were £83,365, a decrease of £2,546 in comparison with 1937. In the expenditure of £74,967 there was a saving of £1,716, and net receipts amounted to £8,398. After meeting fixed charges there is a balance of £2,998 placed to the credit of net revenue account.

Dublin United Tramways Co. (1896) Ltd.—For the year 1938 net profits amounted to £108,874—an increase of £19,441 over that for 1937. Revenue from tramways was smaller, but this was more than made good by increased receipts from buses. Taxation absorbs £24,890, against £10,986. Dividends and allocations are the same as before, namely, 3 per cent. for the year on the ordinary stock, £20,000 to renewals (general reserve), and £20,000 to mortgage and debenture redemption. The balance forward is £13,835 (against £13,095). Approval of the balance sheet by the auditors is subject to adjustment of the capital account consequent upon the closing down of the power station some years ago and the recent discontinuance of certain sections of the tramways, and also to the application of the company's reserves in meeting capital expenditure.

International Railways of Central America.—Railway operating revenues in 1938 were $5,639,240, a decrease of $60,202 from 1937. In the railway operating expenses of $3,380,158 there was an increase of $149,251, due entirely to larger sleeper replacements, and the higher original cost of importing and using creosoted instead of local sleepers. Total income amounted to $2,145,390, compared with $2,363,290 in 1937, and fixed charges were covered 1·84 times. Net income, after all charges, taxes, and reserves, was $930,521, equal to $9·30 a share of preferred stock on which there were arrears of $26·25 a share on December 31, 1938. Net income for the year 1937 was $1,102,428. Out of the 1938 net income of $930,521, dividends totalling $5 a share, or $500,000 in all, were paid to preferred stockholders, and the balance of $430,521 was transferred to profit and loss. Heavier rail was substituted on 14 miles of main line during the year. Banana traffic increased substantially and coffee was slightly better than in 1937 because of an improvement in coffee prices during the last three months.

Birmingham Canal Navigations.—The report for 1938 shows total receipts of £87,177, a decrease of £17,383 in comparison with 1937, mainly due to the closing down, temporarily or permanently, of certain local electricity generating stations, development of rationalisation schemes by industrial concerns, and improved land-sale wharf facilities at local collieries. Net rents from property, easements, &c., produced £31,696, an increase of £1,730. A sum of £15,492 is available for dividends (against £33,732 in 1937), and the additional sum of £82,091 required to make up a dividend of 4 per cent. has been provided by the London Midland & Scottish Railway Company under the terms of arrangement.

Associated Electrical Industries Limited.—Gross profit for the year 1938 amounted to £1,399,499, against £1,290,008 for 1937. After deducting £505,257 for taxes and N.D.C., against £380,759, and £229,934, compared with £217,756, for depreciation, there is a balance of profit of £664,308, a decrease of £27,185 on the previous year. The ordinary dividend is maintained at 10 per cent. and sums of £100,000 are allocated to special reserve and to dividend equalisation account. The amount brought in is £220,015, and the sum proposed to be carried forward is £251,647. The inflow of orders during 1938 was greater than in any previous year except for 1937, which was a record. All the works of the group were fully employed and the output was the highest in the history of the company. The unexecuted orders on hand at the end of the year were slightly less than at the end of 1937.

Bruce, Peebles & Co. Ltd.—The profit for the year ended December 31, 1938, including interest received and transfer fees, and after deducting administration expenses, amounts to £47,758 (against £39,412), to which falls to be added £4,115 brought forward, making a total of £51,873. Of this amount £10,000 has been applied to depreciation account, £6,000 as provision for A.R.P., £8,000 to taxation reserve account, and £3,500 to general reserve account, leaving a balance of £24,373. The directors recommend a dividend on the preference stock of 7½ per cent. for the year, less tax, and a further dividend of 2½ per cent., less tax, making the full 10 per cent., payable March 31 ; also a dividend on the ordinary stock of 5 per cent., less tax, with a bonus of 2 per cent., less tax, both payable on March 31, leaving £6,821 to be carried forward. The works have again been fully employed, and the year's operations resulted in a substantial increase in output and trading profit.

Forthcoming Events

Mar. 31 (*Fri.*).—Institute of Transport (Manchester-Liverpool), at Exchange Station Hotel, Liverpool, 6.30 p.m. Discussion : "Shipping Problems."

Institution of Locomotive Engineers (London), at Trocadero Restaurant, Shaftesbury Avenue, W.1. Annual Dinner.

Apr. 1 (*Sat.*).—Permanent Way Institution (Manchester–Liverpool), at Sandiacre, Nottingham. Visit to Messrs. Taylor Bros.

Apr. 3 (*Mon.*).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. "The Incidentals of a Railway Electrification Scheme," by Mr. W. England.

Stephenson Locomotive Society (London), at Dining Club, King's Cross Station, L.N.E.R., 6.30 p.m. "The Hook Continental from the Fireman's Point of View," by Mr. W. Lee.

Apr. 4 (*Tues.*).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. Annual General Meeting.

Institute of Transport (Leeds), at Hotel Metropole, 6.30 p.m. Annual General Meeting. "Compensation Claims," by Mr. L. Fitzpatrick.

Institute of Transport (Metropolitan Graduate), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Some Observations on Transport in London," by Mr. J. Wood.

Société des Ingénieurs Civils de France (British), at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. Joint Meeting with Inst. of Transport. "Refrigeration on Railway Rolling Stock," by M. Verlot.

Apr. 5 (*Wed.*).—Permanent Way Institution (London), at Underground Railways Dining Club, Pelham Street, S.W.7, 7 p.m. "Permanent Way Metallurgy," by Mr. T. Turner.

Apr. 7 (*Fri.*).—Omnibus Society, at Inst. of Marine Engineers, The Minories, London, E.C.3, 7 p.m. "Bus and Coach Operation in Canada and the United States," by Mr. H. Chambers.

Stephenson Locomotive Society (Scottish), at Ewart's, Bernard Terrace, Edinburgh, 7 p.m. Discussion.

XUM

Railway Share Market

Uncertainty as to the outlook for international affairs has continued to restrict business on the Stock Exchange, and although no heavy selling pressure was in evidence, share values have again moved to lower levels on balance for the week. With the approach of the Easter Holidays and a disposition to await the Budget, surrounding conditions are not favourable for an early return of active markets, although it is generally believed that share values would improve rapidly should more hopeful views prevail in regard to the European political situation.

Had market conditions been less uncertain there seems little doubt that Home Railway securities would have shown good response to the traffic receipts for the past week. The figures are the most encouraging which have come to hand for a long time, and they have increased the view that the better trend in receipts is likely to be accelerated. Moreover hopeful views persist in connection with the "Square Deal."

L.M.S.R. stocks were firmer on the traffic increase of £12,000 for the past week. The 4 per cent. 1923 preference attracted attention around 29½, while the 4 per cent. preference was 47½, and the ordinary stock around 13. The 4 per cent. guaranteed stock transferred around 78½ and the 4 per cent. debentures were 90. In most cases yields offered by guaranteed stocks and debentures continue to be viewed as attractive, and in some cases it is possible a rise of several points may be shown when there is a sustained market recovery. L.N.E.R. first and second preference were 25½ and 10½ respectively, the first guaranteed 67½ and the second guaranteed 53, while the 3 per cent. debentures were 63 and the 4 per cent. debentures 84. Southern issues were inclined to react on disappointment with the £9,000 decrease in the past week's receipts, as it had been expected in some quarters that the latter would disclose an increase. Nevertheless the traffic outlook continues to be regarded as promising, and it is estimated that the benefit likely to accrue to the Southern, if the increase in fares in the London area were granted, would offset the increased charges that have to be met this year in respect of debenture interest. Consequently the possibility of the deferred stock returning to the dividend list for 1939 continues to be viewed hopefully, and the trend in traffics during the next few months will, therefore, be followed with considerable attention. The deferred stock has transferred up to 14 and the preferred stock around 62½. Great Western ordinary improved slightly to 26 on the announcement that the traffic figures for the past week show a decrease of only £1,000. London Transport "C" attracted buyers on any decline, sentiment having remained under the influence of the proposed increase in fares.

Inactive conditions continued in Foreign Railway stocks, and the downward tendency in those of the Argentine companies was continued, despite the belief that the Argentine railways are likely to be better placed to meet road competition in future. Elsewhere San Paulo was inclined to improve, and Leopoldina debentures were slightly better. Lower prices ruled for American railway securities, including Canadian Pacific ordinary and preference. French rails were dull, and Nord has fallen to 98½.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1938-39	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1938	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1938	Prices: Lowest 1938	Prices: Mar. 29, 1939	Yield % (See Note)
South & Central America	Antofagasta (Chili) & Bolivia	834	28 3.39	£ 16,650	– £ 2,320	12	£ 166,850	£ 211,650	– £ 44,800	Ord. Stk.	14	7¼	7	Nil
	Argentine North Eastern ..	753	25.3.39	9,094	+ 1,489	39	371,425	356,366	+ 15,059	,,	6½	2	4	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	A. Deb.	82	75	72½	5½
	Bolivar	174	Feb., 1939	3,700	+ 200	8	7,100	7,100	—	6 p.c. Deb.	8	7	7	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	10	4	6½	7 11/16
	Buenos Ayres & Pacific ..	2,806	25.3.39	116,129	+ 9,553	39	3,308,875	3,397,833	– 88,958	Ord. Stk.	6½	3¼	4	Nil
	Buenos Ayres Central ..	190	18.3.39	$72,800	– $27,600	38	$3,895,200	$4,536,900	– $641,700	Mt. Deb.	15½	8	14	Nil
	Buenos Ayres Gt. Southern	5,082	25.3.39	171,960	+ 2,667	39	5,554,465	5,859,986	– 305,521	Ord. Stk.	17 5/16	8½	9	Nil
	Buenos Ayres Western ..	1,930	25.3.39	58,313	+ 12,842	39	1,722,953	1,771,774	– 48,821	,,	12¾	5	7	Nil
	Central Argentine	3,700	25.3.39	134,957	+ 31,254	39	4,514,653	4,798,773	– 284,120	,,	13¼	5¾	8½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	6	2½	3½	Nil
	Cent. Uruguay of M. Video	972	18.3.39	18,399	– 611	38	693,233	680,837	+ 12,396	Ord. Stk.	3	1¼	1½	Nil
	Cordoba Central	1,218	—	—	—	—	—	—	—	Ord. Inc.	3/8	3/4	2¼	Nil
	Costa Rica	188	Jan., 1939	16,626	– 6,724	31	155,492	178,556	– 23,064	Stk.	28	22½	22½	8/8
	Dorada	70	Feb., 1939	12,800	– 1,900	8	26,100	32,400	– 6,300	1 Mt. Db.	105¼	104	103½	5 15/16
	Entre Rios	810	25.3.39	17,481	+ 3,480	39	605,189	562,711	+ 42,478	Ord. Stk.	7¼	3½	5	Nil
	Great Western of Brazil ..	1,092	25.3.39	9,600	+ 2,500	12	135,400	106,200	+ 29,200	Ord. Sh.	3/-	1/-	¼	Nil
	International of Cl. Amer...	794	Jan., 1939	$548,273	+ $61,132	4	$548,273	$487,141	+ $61,132	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	1st Pref.	6d.	6d.	½	Nil
	La Guaira & Caracas ..	22¾	Feb., 1939	4,655	– 315	8	9,405	9,580	– 175	Stk.	8	6½	7½	Nil
	Leopoldina	1,918	25.3.39	23,517	+ 3,720	12	251,518	233,753	+ 17,785	Ord. Stk.	4	1	2	Nil
	Mexican	483	21.3.39	$314,200	– $7,500	11	$3,547,500	$3,628,100	– $80,600	,,	1/4	1/16	1/8	Nil
	Midland of Uruguay ..	319	Feb., 1939	9,048	– 1,572	35	73,489	75,972	– 2,483	,,	7/8	1/2	1/2	Nil
	Nitrate	386	15.3.39	7,012	– 1,437	10	28,214	39,775	– 13,561	Ord. Sh.	52/9	19/16	15/8	6 1/8
	Paraguay Central	274	18.3.39	$3,203,000	+ $268,000	38	$114,447,000	$118,011,000	– $3,564,000	Pr. Li. Stk.	60	55½	47½	12 5/8
	Peruvian Corporation ..	1,059	Feb., 1939	61,801	– 10,736	35	539,567	660,322	– 120,755	Pref.	5¾	1¾	2¼	Nil
	Salvador	100	18.3.39	¢30,750	+ ¢5,700	38	¢807,464	¢759,725	+ ¢47,739	Pr. Li. Db.	23	20	19½	Nil
	San Paulo	153½	19.3.39	28,654	+ 4,323	11	306,264	352,613	– 46,349	Ord. Stk.	64	28	26½	15 1/16
	Taltal	160	Feb., 1939	3,010	+ 1,170	35	23,795	30,670	– 6,875	Ord. Sh.	15/16	1/2	1/2	10
	United of Havana	1,353	25.3.39	46,957	+ 997	39	889,048	953,698	– 84,650	Ord. Stk.	3½	1/2	1	Nil
	Uruguay Northern	73	Feb., 1939	789	– 255	35	8,250	7,481	+ 769	Deb. Stk.	2	1	2	Nil
Canada	Canadian National	23,772	21.3.39	640,488	– 2,673	11	7,244,342	7,255,450	– 11,108	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	72	60	69	5 15/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	104	90	97½	4 1/16
	Canadian Pacific	17,186	21.3.39	453,000	– 29,800	11	5,170,400	5,363,400	– 193,000	Ord. Stk.	8 7/16	4¼	4½	Nil
India†	Assam Bengal	1,329	10.2.39	44,032	+ 1,914	50	1,438,444	1,321,543	+ 116,901	Ord. Stk.	81½	70	73½	4 1/16
	Barsi Light	202	10.3.39	2,940	– 1,252	50	129,930	131,580	– 1,650	Ord. Sh.	60½	54¼	54½	7 5/16
	Bengal & North Western ..	2,108	10.3.39	73,582	+ 11,501	23	1,291,243	1,255,846	+ 35,397	Ord. Stk.	31	27/8	26	6 7/8
	Bengal Doors & Extension	161	10.3.39	2,816	– 641	50	140,672	139,026	+ 1,646	,,	89	83	85	7 5/8
	Bengal-Nagpur	3,272	10.3.39	209,250	– 12,349	50	6,643,037	6,685,223	– 42,186	,,	95½	90	90½	4 7/16
	Bombay, Baroda & Cl. India	3,085	20.3.39	257,775	– 9,825	51	8,561,850	8,668,800	– 106,950	,,	112 7/16	95	103½	5 3/4
	Madras & Southern Mahratta	2,967	28 2.39	149,175	+ 173	49	5,144,044	4,867,206	+ 276,838	,,	108	97	100½	7 7/16
	Rohilkund & Kumaon ..	571	10 3.39	13,523	– 7,218	23	239,992	247,522	– 7,530	,,	308	285	272	6 5/8
	South Indian	2,531¾	28.2.39	97,724	– 3,916	49	3,750,541	3,835,654	– 85,113	,,	104	101	100½	5
Various	Beira-Umtali	204	Jan., 1939	76,317	– 3,514	17	326,567	356,561	– 29,994	—	—	—	—	—
	Egyptian Delta	620	10.3.39	5,923	– 161	50	213,620	225,760	– 12,140	Prf. Sh.	7/8	5/8	1/2	Nil
	Kenya & Uganda	1,625	Feb., 1939	253,899	– 1,712	8	503,301	539,655	– 36,354	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	49	41	43½	9 5/16
	Midland of W. Australia ..	277	Jan., 1939	14,947	+ 1,305	31	107,233	97,977	+ 9,256	Inc. Deb.	93¾	89	93	4¼
	Nigerian	1,900	11.2.39	48,351	– 4,894	46	1,837,424	2,514,793	– 677,369	—	—	—	—	—
	Rhodesia	2,442¾	Jan., 1939	339,253	– 53,949	17	1,511,391	1,710,441	– 199,050	—	—	—	—	—
	South Africa	13,285	11.3.39	635,830	+ 26,765	49	30,701,325	31,705,225	– 1,003,900	—	—	—	—	—
	Victoria	4,774	Dec., 1938	859,188	– 55,580	26	4,733,741	4,747,229	– 13,488	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee § ex dividend

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being over estimated. The statements are based on the current rates of exchange and not on the par value